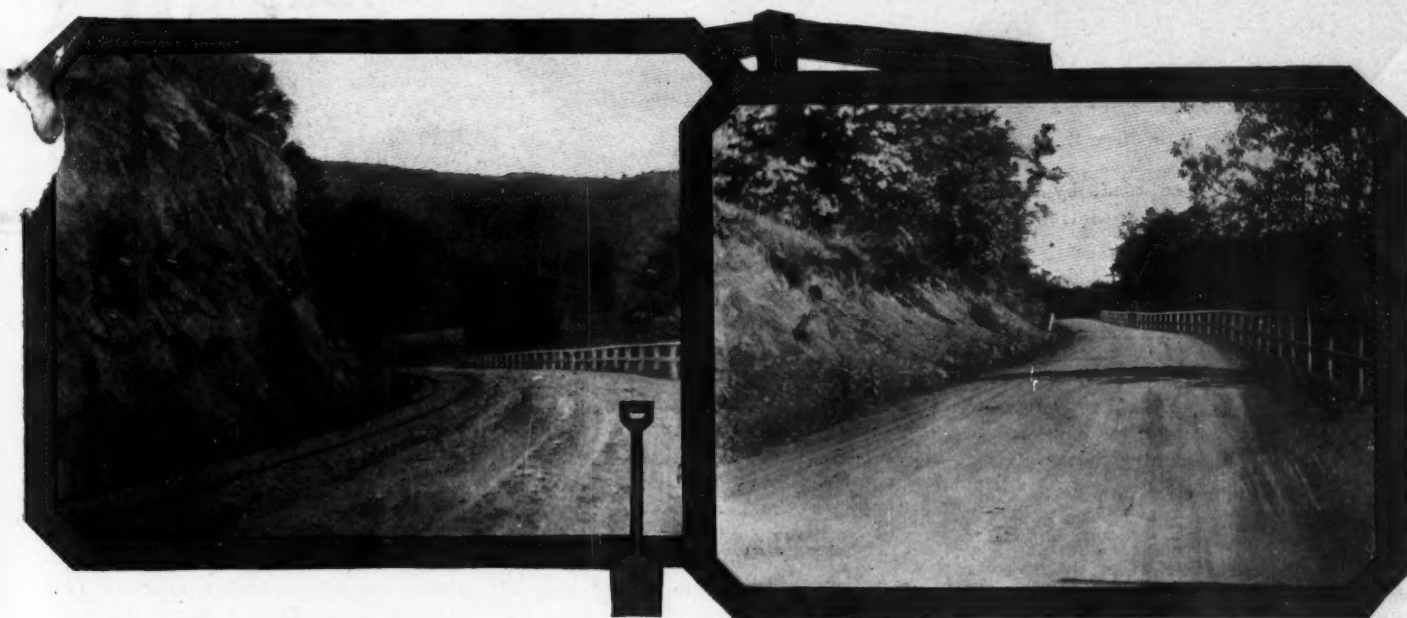


MOTOR AGE

APPROVED STATE ROAD CONSTRUCTION



STATE ROADS IN NEW ENGLAND, RIGHT-OF-WAY WELL FENCED AT DANGER POINTS

It is astonishing when we comprehend, or contemplate what our country has grown to; from 5,000,000 of people 107 years ago, to 85,000,000 of people; 827,000 square miles to 3,000,000 square miles; from sixteen to forty-six states and five territories, according to Brother Page's record—and no man in this country has paid more attention to accurate details than has our present chief of the bureau of highways from the department of agriculture, L. W. Page, who, I am happy to say, is with us today.

We have in this great country today 2,500,000 miles of roads, and classified as improved roads only about 135,000—about 7 per cent of that entire great mileage. And placed in the hands of forty-two men are 850,000 miles of those roads; and I say frankly—and I speak from intimate personal acquaintance with the matter—that if those forty-two men were removed from their official places today I do not know where we could replace them. What this country wants today is road builders. I do not

mean men who have learned the theory of road building, but practical road builders who can take a dollar and make it go just as far as it is possible for that dollar to go, and yet, in the expenditure of that dollar to get every cent in value

EDITOR'S NOTE—This is Part I of an address delivered by James H. MacDonald, Highway Commissioner, State of Connecticut, at Good Roads and Legislative Convention of American Automobile Association, Convention Hall, Buffalo, N. Y., July 7 and 8, 1908. In Part II, to be published next week, Commissioner MacDonald uses fourteen illustrations showing different styles of road construction and graphically describes each of them.



SAMPLE OF IMPROVED STATE ROADS IN NEW ENGLAND

for the money by judicious construction.

In the state of Connecticut, from the day we first made an appropriation of \$75,000 for the first year down to the time when that little state came up loyally in its interest for highway improvement, intelligently understanding the necessity for the roads to be improved, and made an appropriation of \$4,500,000, we have not heard a single objection from our people to any appropriation made towards the betterment of our highway system. We do not find it is a question of money anywhere in the United States, for we have been spending money enough to have built every main highway in this country and made them all splendid roads for 365 days in the year, if that money had been intelligently expended.

Referring to the highways of Europe, which have been the admiration of the world for their grandeur, smooth condition and durability, I understand that they are sending over from France today inquiring what they shall do, after having expended \$600,000,-



POOR DIRT ROAD NEAR SAUGERTIES IN NEW YORK

000 on 24,000 miles of road, by reason of the fact that since the introduction of the motor car, if something is not done to remedy the havoc that is being wrought by the car, they will lose the entire principal.

With all the education commissioners have had, with all the experience we have gained, both in a personal way by research, investigation and reading, every commissioner in this country today is confronted with this great problem of what we are to do with the roads that we have in our charge.

East of the Mississippi river the largest proportion of the improved roads has been built. West of the Mississippi river they haven't gone into this question of putting down stone roads to the extent that we have in the east; so the Mississippi river divides this question. East of the Mississippi river we are inquiring what we shall do with the roads that have been built—to preserve and protect them against destruction. West of the Mississippi river they are asking "how shall we build our roads?"

Think of the money that has been wasted in this country from lack of knowledge. You have an exhibition of preservatives in Buffalo to show us how to take care of the macadam road after it is constructed. So it is a vital question, as you enter upon this great and extended system that you have just inaugurated, or are beginning to inaugurate, how you shall keep these roads after you have constructed them. When you are through with all of your investigation, and when you have tried everything that has been presented to you for the care and maintenance of a macadam road, you will come down to the simple proposition of putting God's best gift—water—on the road. Nothing, in my judgment, will protect a macadam road, will give it life, will give it elasticity, will ensure its continu-

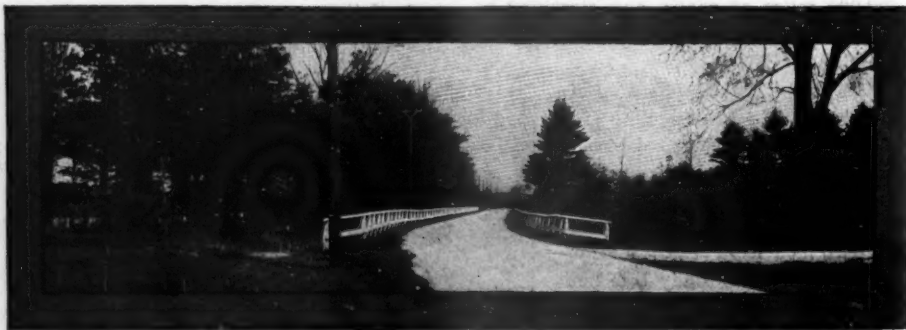
ance, like pure water. Ah, but you say, "We cannot afford to put on water." Well, then, you will never have a satisfactory solution of this question, although we will continue to use oil, tar and preservatives of all kind, for the reason that they are cheaper, apparently.

We hear a great deal said about national aid. Self help is the best help. It is not a wise policy for this country to allow states to indiscriminately put their hands into the treasury of the United States—in obedience to any demand from any class of men, to make a political jackpot of the treasury in an indiscriminate passing round of the public purse in that kind of a way. Our association doesn't stand for that. Our association, of which I am the president, stands for state aid. Let the state, in her sovereign right, occupy her privilege of taking care of her own interests under some definite and intelligent plan first before assistance from the outside is extended—not only in good roads, but in everything else.

It is just as incumbent on the United States congress to establish in this country a system of national highways for military uses for the purpose of mobilizing the army, as to assume the obligations it has in a thousand other directions. There should be a national highway along the Atlantic ocean and another on the Pacific

coast, from Los Angeles to Seattle, for 1,200 miles; also another skirting the gulf states and another below the lakes of the north, all joined and connected—a continuous, unbroken chain. When we started that system of national highway, running 13 miles through Maryland, 80 miles through Pennsylvania, 13 miles through West Virginia, 240 miles through Ohio, 170 miles through Indiana and 176 miles through Illinois, we stopped too early, and as a great wave going up against a rock is checked in its progress, so this nation was retarded in its growth by reason of the fact that the great highway stopped there. It should have gone on.

For military protection these national highways should be built by the United States government, but under a system of surveillance by the government, by its own engineers, and those roads should be built so they would circle this glorious country. This country has some great propositions before it. One is irrigation; another is internal waterways, and another is good roads, not only in their construction, but also in maintaining them, which would result in increased comfort and convenience to our people, and would add to the reputation of our country by so doing. Go abroad to see the Alps; you see the lakes and other objects of interest in the old world; you come back and talk about the beauties of other lands and seemingly forget what we have here in America. I stood in Washington and looked out at the snow-capped mountain, Rainier, the sunlight gleaming on it and the streams running down from its snow-capped summit. I have seen Mount Olympia and Mount Baker; Mount Whitney in California and Mount Massive in Colorado—grand sights. Any man who ever went to the Grand Canyon in Arizona must have stood in awe before its splendor and coloring, and as he viewed its beautiful changing lights and shadows, truly he must have felt that God had dropped his palette there. It is a beautiful scene. No place in this world has more beautiful objects of interest to present than have the Grand Canyon and the Yellowstone park; your magnificent palisades here on the Hudson—little spoken about and yet deserving of the highest mention—also your own Lake George and Niagara falls—glorious and magnificent! And so I



PORTIONS OF IMPROVED HIGHWAYS NEAR LOWELL, MASS.

could go on and name our Green mountains, our White mountains, our Sierra Nevadas, our Cascades, and a thousand and one objects of interest. There is no place on God's footstool where can be found a more beautiful panorama than we have in this country. And if we have this splendid system of highways built throughout the country by the nation we would accomplish a great deal more than in trying to build up a system of highways with national money without a system well planned. It is the only way to intelligently disburse that money. I have always held to this principle in my own state—and we practice it—that the point of contact should be very close to the taxpayer's dollar and the man who expends it. There should be no intermediary between the two, but, on the contrary, a fixed and definite responsibility should be placed, and no opportunity should be accorded to sidestep.

The nation should build a system of national highways, and, second, every state in the union should have, with the travel that is had upon our highways, a system of main highways built and maintained solely and exclusively, without any contribution on the part of any town or any abutting owner through which that road goes, with state money. Our roads have ceased to be a local matter; they belong to the public. It is an impossibility for us to maintain these main highways and ask these little towns to contribute of their hard earned means to do so; and, if God spares my life until the next legislature convenes, I shall ask that certain main highways in my state—Connecticut—be assumed as a state obligation, to be built and maintained entirely out of the state treasury. And then the towns will have enough to do. We might just as well meet this question today; there is no better time; there is no better place to meet it than right here.

Through the courtesy and the permission of the state of Connecticut I have a motor car in my work. I suppose, in its possession, I occupy just about the same position as does a man when he first becomes a grandparent. He is always looking about for some ingenious way to relate the fact. And with that car since the first of last June I have traveled mile for pound in my state work as highway com-



UNIMPROVED MOUNTAIN ROAD IN ALLEGHANIES EAST OF PITTSBURG

missioner. The car weighs 3,600 pounds.

They have a practical way of doing things in Springfield, which it would be well to copy. When they have a road that goes through a poor little town, and they want to use it as a main highway, recognizing the poverty of the town and desiring in a practical way to assist them, they go out and collect money. Several hotels have contributed; members of the Springfield club have contributed—sometimes as high as \$1,000—and they have turnpiked that road and rounded it up and made it a splendid road to travel over. In Pennsylvania they are doing the same thing. It doesn't cost much to contribute the little portion that a town has to pay and you get the return. I never knew any class of men who were more liberal than the gentlemen who ride in the motor car, nor men who give up their money more freely—and I have met a whole lot of them—and I say this is a practical way to work out that suggestion.

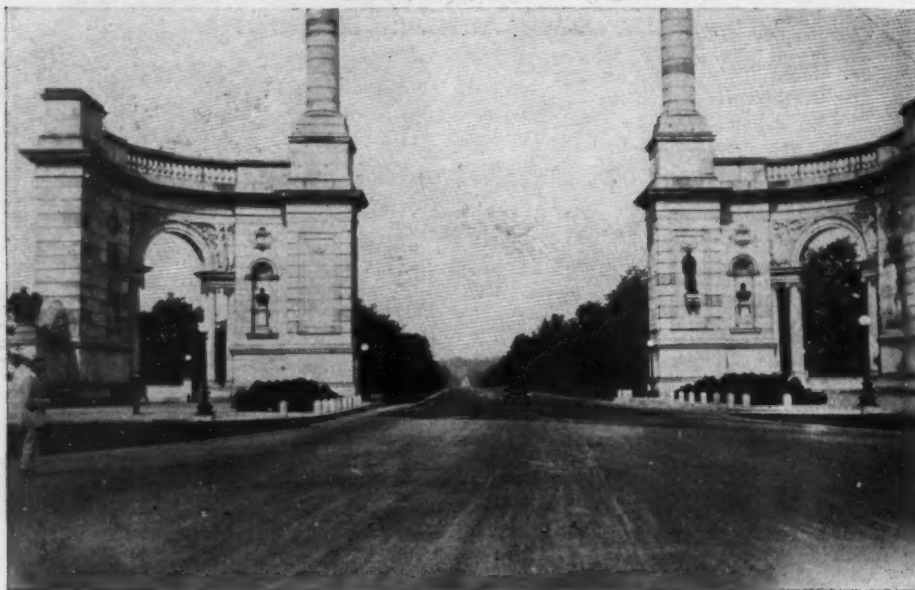
In the care-taking of roads, men who use the motor car can help out a great deal. It isn't necessary to travel in the same old rut and accentuate it. It is just as easy to straddle it. You are making a rod to whip yourself when you do it. You can assist in a great many ways to continue the road. And when a newly-built

macadam road presents itself do not open the throttle and go ahead at 50 or 60 miles an hour. That road is just going through its seasoning process and it hurts it to burn it out. If you want a splendid road to continue for years treat it kindly. No amount of work or water will bring that road into the conditions the old roads are in, until it gets the seasoning process of use. Many road builders have found it beneficial to station warning signs at the ends of recently constructed roads to notify motorists to reduce speed instead of increasing it over them.

I have noticed another thing, in connection with the travel since the extension of the trolley line system, and that is we do not have as much light carriage driving. We see more motor car driving, even on our main highways. And a road, to be at its best and continue in a pleasant, safe and firm condition, must have mixed travel, or else you have got to build a road like A. R. Pardington is building on Long Island—a rigid road. It needs mixed travel to bring the road up to the condition that it will resist the onset and the travel of the motor car. Outside of the question of watering you have got to resort to oil, coal tar and all other expedients. The people do not want to spend a large amount of money, no matter if they see that oiling is cheaper. And so we go on experimenting with the different kinds of oil, the different methods, until some day we will wake up and acknowledge that it is all wrong. But I make this prediction, that when the national government builds its main highways—as it will—and when the states in the union build their main highways—as they will have to—then this stress will not be so great, or will the clamor for highway improvement be quite so zealous as it is today, because, as the good book says, every man who rides in a motor car "will awake and be satisfied."



FIFTEEN PER CENT GRADE ON NEW ENGLAND GRAVEL ROAD



ON THE CONCOURSE—SMITH MEMORIAL TO CIVIL WAR SOLDIERS



TURNS ON COURSE ARE GRADUAL AND WIDE



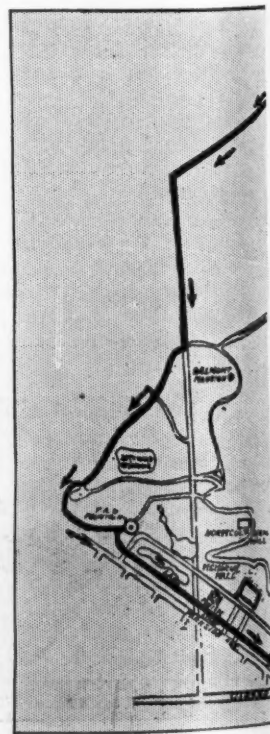
ON LANSDOWNE DRIVE, APPROACHING WEST RIVER DRIVE

Philadelphia Park

PHILADELPHIA, Pa., Sept. 14—Public opinion was too much for the conservative Fairmount park commission, and at its meeting last Friday it unanimously consented to grant the use of certain roads in the park on Saturday, October 10, to the Quaker City Motor Club for running off its 200-mile founders' week stock chassis road race. But before granting the desired permit the commissioners bound up the club with conditions to the limit. The club must put up a cash bond of \$2,500 to guarantee the repair of any damage to the roads, and file a surety bond of \$25,000 to insure the commission and city from loss in case either is sued for injury to persons or property as a result of the race. Another condition precedent to the granting of the permit was the elimination of several bad turns, and changing the course by cutting out about 2 miles of the proposed route around Horticultural hall and the lily pond; these changes, in the interest of safety, reduce the length of the course to 7.8 miles. The commission also insisted that the grade of oil proposed to be used by the Q. C. M. C. must be approved by the chief engineer and the superintendent. All these provisos were accepted by the club unhesitatingly, and although several letters from citizens were read protesting against granting the use of the park for any such purpose, the commission, to a man, voted for the proposed motor car race.

The route as finally revised is: Eastward from the start on the south concourse, in front of Memorial hall, to Lansdowne drive, down Sweetbriar hill, to West River drive, to Neill drive, to City Line avenue, to Belmont avenue, to North Wynnesfield, to Fifty-second street, to the concourse, and thence to the starting point. This means about twenty-six trips over the course to finish the 200 miles. The commission also agreed to allow the use of the course for practice purposes "for 1 week prior to the race, from 7 a. m. to noon of every day."

That the Q. C. M. C. committee was assured that the desired permission would be granted is evident from the fact that entry blanks were mailed to the manufacturers on the



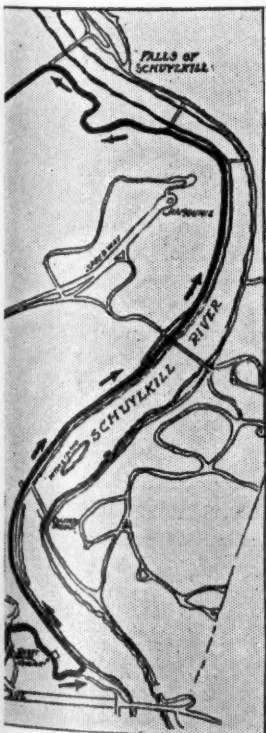
MAP OF PHILADELPHIA

Road Race Certainty

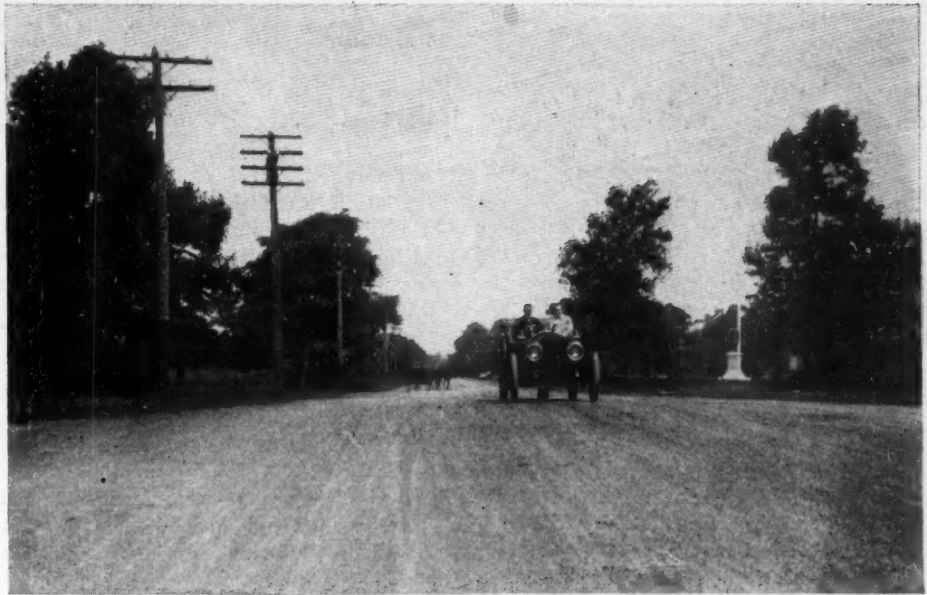
same day that the park commission granted the permit. The official title of the contest, which will be under A. A. A. rules, is "Founders' Week Stock Chassis Road Race," and it is open to any regular make of stock car, with a total piston area of at least 56.7452 square inches. Among the conditions are the following: Each car must be equipped with a hood, must be subject to examination by a technical board, and besides being of standard tread, must conform with all the specifications in current catalogs, barring mud guards, lamp brackets, running boards, etc. There will be no limit on the kind of tires and rims, but no anti-skid devices will be allowed. There will be no limit on the weight of the car or on the gear ratio. Shock absorbers may be used, at option of entrant; exhaust must be horizontal, either backward or through the side of the hood. The usual restrictions are provided for in the case of repairs and adjustments, extra parts, etc., and driver or mechanic, or both, may be changed, if necessary, during the contest. The entrance fee for each car is \$350, and the Quaker City Motor Club will refund \$100 for each car that makes a bona fide start. Owing to the short course not more than three cars of any one make will be accepted. The total number of cars that may be entered is twenty, and the first twenty will have the preference, the time of postmark to determine such.

Contestants are assured of a thoroughly protected course, the authorities having practically promised that the 10,000 or more troops that will be in the city during the week will be utilized for patrol purposes. All the turns will be banked, where necessary, although the extreme width of the road will render this unnecessary in most instances. The course will be thoroughly oiled and otherwise treated until an average of a mile a minute will be a possibility on the day of the contest. Entries will close October 7, with Secretary H. C. Harbach.

With the shortened course the interval between the starters will be reduced to 30 seconds, or possibly less. With the exception of about a mile on City Line avenue the course is sufficiently wide for half a dozen cars abreast.



PARK ROAD RACE COURSE



THE CONCOURSE—DOWN HOME STRETCH FROM FIFTY-SECOND STREET



NEILL DRIVE, THOUGH WIDE, IS QUITE TORTUOUS



ON NEILL DRIVE, APPROACHING CITY LINE ROAD

American Cars One, Two In



HARRY COBE, OF WINNING LOZIER TEAM

NEW YORK, Sept. 15—Two American cars, both Loziers, one a six-cylinder driven by Mulford and Cobe, the other a four-cylinder piloted by Michener and Lynch, finished respectively first and second in the 24-hour race promoted by the

hour respectively of 44.9 and 44.7 miles. A Fiat, a make that evolved victorious in the last 24-hour race held in the metropolitan district, was forced to accept the place of runner-up to the American pair. A Renault, the other European make represented, and incidentally the record holder, also went down in defeat, but through an accident in the second hour of the race which put it out of the running altogether. A Stearns and an Allen-Kingston followed in order in fairly close pursuit. Of the eleven starters there were practically ten survivors, although one of these did not appear on the track during the last 2 hours of the contest.

That the meet was "outlaw" in that it was run without asking the sanction of the racing board of the national organiza-

There were few men of prominence in the racing world on the official stand. Robert Lee Morrell was a referee, S. M. Butler and A. L. McMurtry were among the timers. Tom Moore essayed to masquerade as a "Wag" pro tem. with the starter's flag, and Charley Earl was an announcer.

At 8:30 o'clock sharp Tom Moore pressed a button at the end of a long wire and the siren shrieked a shrill signal for the start. Whether President Roosevelt was at the other end of the judges' stand telephone wire, as per the press notices, the announcer failed to make known. With the press agent's proud paragraph in the late editions of the evening papers, the incident perhaps may have been closed. There was an exciting scramble around



START OF BRIGHTON BEACH 24-HOUR RACE



LIVELY SPRINT DOWN HOME STRETCH

Motor Racing Association at the Brighton Beach mile track, Friday and Saturday. Both succeeded in surpassing the circular track record mileage of 1,079 miles made by Bernin and La Croix at the Morris Park 1.39 miles oval last year. The winner was 28 miles ahead of it and the second car beat it by 13 miles, with an average speed per

tion has been too widely heralded to be unknown to any follower of the news of the racing game.

The outcome of the meet showed that the public at large interests itself but little with the sanction or anti-sanction controversy so long as it sees the prospect of good racing at the moment. There was a big, a very big, in fact a record crowd in attendance on both Friday and Saturday nights. The gross receipts from the two afternoons and evenings are rumored to have approached \$25,000 and the expenses to have been in the neighborhood of \$14,000, which leaves a snug profit.

the first turn and a mad scamper down the back stretch, from which Laurent evolved with the Stearns as leader of the first mile in 1:20. Lozier No. 1 and No. 2 led in this order at the end of the first hour with 48 miles to their credit.

The fight for the lead grew even hotter in the second hour. Lozier No. 1, Simplex, and Allen-Kingston were having a neck-and-neck three-cornered fight. They finished the second hour even with 101 miles each and tied with the record made by the Simplex at Morris Park. Before the second hour was little more than half way through, the contingent of the crowd



RALPH MULFORD, OF WINNING LOZIER TEAM

SUMMARY OF THE BRIGHTON BEACH 24-HOUR RACE, SEPTEMBER

	1	2	3	4	5	6	7	8
Lozier, Mulford and Cobe.....	48	99	139	185	232	279	320	371
Lozier, Michener and Lynch.....	48	101	142	191	239	275	312	359
Fiat, Capra and Parker.....	46	99	137	184	230	273	312	364
Stearns, Laurent and Marquise.....	46	97	136	184	231	270	313	353
Allen-Kingston, Rippigill and De Palma.....	46	101	143	192	235	284	332	380
Simplex, Robertson and Lescault.....	45	101	146	193	245	294	296	296
Thomas, Roberts and Martin.....	40	86	122	162	203	237	278	316
Acme, Strang and Rodgers.....	29	42	65	108	157	194	240	289
S. P. O., Kjeldsen and Juhasz.....	36	55	55	55	55	60	98	136
Garford, Vantine and Dady.....	33	33	41	54	83	83	83	83
Renault, Sartori and Clement.....	46	64	Ran into fence and retired					

Brighton Beach 24-Hour Race

whose interest lay mainly in the possibilities of smashed cars and broken bones got their money's worth in the first and only accident of the race. It put the Renault out of the race and its crew in the hospital. The S. P. O., a 16-horsepower taxicab chassis with racing body, and another car, blocked the way of the Renault on the back stretch through being too far out from the pole. Paul Sartori, who was at the wheel of the Renault and has a reputation for recklessness, tried to cut through on the inside, struck the taxicab and deflected his own car through the fence. His racer was upset and completely wrecked. Sartori's arm was broken in two places, and his mechanic, Rene Gourard, sustained severe scalp wounds. It took nearly 4 hours to repair the S. P. O.,

former figures. From this point on the leaders kept well ahead of the Morris Park figures. In gaining and maintaining the lead Robertson had driven a reckless race, utterly unmindful of any possibility of fuel exhaustion. His punishment came through the water giving out. A dry radiator and two cracked cylinders practically destroyed all chances the speedy Simplex might otherwise have had. The end of his long sprint came at 2:35 a. m., when the seventh hour had hardly begun. It took nearly 3 hours for the mechanics to put in new cylinders.

All this time the triple winner of 1908, Strang, had been lost so far back in the ruck that he was forgotten by the spectators, who had interest only for the heroes of the present. Strang had taken



HARRY MICHENER, OF LOZIER FOUR TEAM

ning shape. Barring the S. P. O. and the Garford, the Acme was then at the tail end of the procession. It was in no shape, however, to show better than a 40-mile-an-hour average to the end of the race.

With the retirement of the Simplex with



A VIEW OF THE CAMPS IN THE INFELD



BRIGHTON BEACH GRAND STAND PACKED ON SATURDAY

which did not again take up the running until the sixth hour.

In the third hour the triple tie was broken by the Simplex and Allen-Kingston cutting away from Michener and having a battle royal of their own for the leadership. It was a hard-fought scrap in which Robertson finally prevailed and secured a 3-mile lead over Rippigill. Michener chased the pair a mile in the rear. The Simplex was now tied with Lozier's 193-mile record for 4 hours at Morris Park.

In the fifth hour Robertson set a whirlwind pace, covering 52 miles, scoring a new record, 245 miles against 237, the

his seat in the Acme with practically not even a trial of the car. In the very first hour Strang had trouble with the car and begun to make stops at the camp. The mechanics insisted that the trouble was with the carbureter. Strang was sure it was something else. Finally the mechanics changed the carbureter. The trouble continued. Strang insisted something was wrong with the pump. An inspection was made along this new line and the pump was found broken. The new carbureter did not work well and the old one was put back again. It was not until the fourth hour that the car was gotten into fair run-

its cracked cylinders, the Allen-Kingston became the most conspicuous performer. For 3 hours it held a lead of from 6 to 12 miles over the Lozier six, scoring 50 miles in the eighth hour. Toward the close of the ninth hour, however, the leader met its Waterloo just as the Simplex had before it. A broken radiator, said to have

11-12, SHOWING THE HOURLY MILEAGE OF EACH OF THE CARS

9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
417	465	515	565	616	664	706	755	803	849	883	928	972	1,016	1,060	1,107
406	458	504	552	601	646	691	740	781	825	870	914	960	1,005	1,048	1,092
411	462	506	556	605	650	693	724	771	815	862	907	950	993	1,039	1,074
398	433	474	522	570	620	659	701	746	784	835	880	923	966	1,008	1,050
423	430	478	523	570	619	657	699	745	789	835	865	906	932	982	1,027
310	361	413	460	505	553	599	647	695	746	800	846	892	938	982	1,029
356	396	437	478	518	561	605	651	691	728	768	804	840	877	918	955
332	375	418	465	514	557	591	631	676	703	749	792	835	879	927	976
166	202	243	278	313	351	389	402	413	443	483	500	533	569	602	635
83	83	93	138	183	220	263	303	318	318	323	344	375	387	387	387



TOM LYNCH, OF LOZIER FOUR TEAM

been caused by a flying stone, put it out of the running long enough to ruin its chances. It took an hour to put in a new radiator, and when Rippigill again entered the race the Allen-Kingston found itself in fifth position.

While the A.-K. was in camp Mulford grabbed the lead, which the Lozier six held tenaciously to the end of the race. The Fiat flashed into second place and Michener held to third like a bulldog. The Fiat held stubbornly to second place from the tenth to the end of the fifteenth hour, when it lost it to Michener and never regained it thereafter, the trio running in the order of their finish to the end.

There was a halt called on the race at half past 1 o'clock on Saturday afternoon that the track might be watered and two or three time-killing events be run so that there might be a late finish to catch a Saturday night crowd, the advertisements having promised that the end would not come until late in the evening.

At 3 o'clock, after a delay of 1½ hours, during which the cars were left at the trackside, untouched, the race was resumed. The radiator and cylinder mishaps of the Simplex and the Allen-Kingston had left them in fifth and sixth positions respectively. Ralph de Palma had taken the wheel of the Allen-Kingston and George Robertson still pluckily stuck to the seat of the Simplex. Though de Palma had the better of it by 50 miles, Robertson pluckily set sail for him, hammer and tongs. The duel of these rival drivers and cars was the feature of the last hours of the race. The eyes of the spectators were focused on the pair, and as they swept by much of the time neck-and-neck the cheering was continuous. Robertson, however, finally won out in the duel, made up his 50 miles, and won out by a couple of laps. In the eighteenth hour he scored 51 and in the nineteenth 54 miles, a total of 105 miles in 2 hours, which comes pretty close to being a track record for a motor car.

The Stearns drivers, Laurent and Mar-

BATTLE FOR THE LEAD AS TOLD BY THE HOURLY MILEAGE

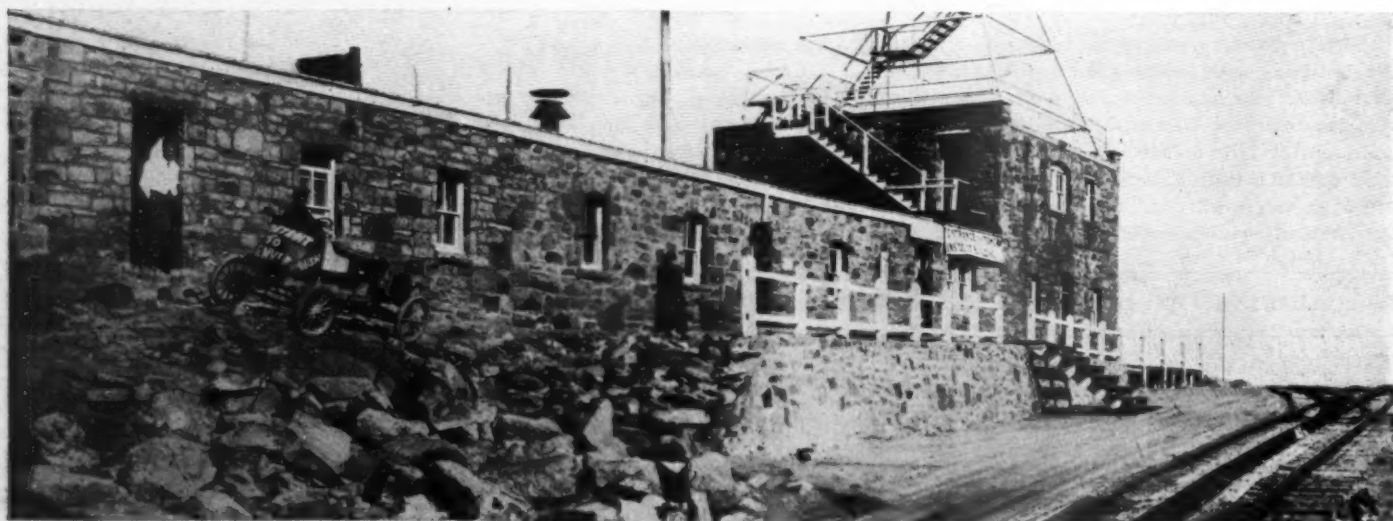
Hour	First	Second	Third	Former Record
1—Lozier No. 1...	48 m.	Lozier No. 2...	48 m.	Allen-Kingston. 46m.
2—Lozier No. 1...	101 m.	Allen-Kingston. 101 m.	Simplex 101 m.	101 m.
3—Simplex	146 m.	Allen-Kingston. 143 m.	Lozier No. 1... 142 m.	146 m.
4—Simplex	193 m.	Allen-Kingston. 192 m.	Lozier No. 1... 191 m.	193 m.
5—Simplex	245 m.	Lozier No. 1... 239 m.	Allen-Kingston. 235 m.	237 m.
6—Simplex	294 m.	Allen-Kingston. 284 m.	Lozier No. 2... 279 m.	286 m.
7—Allen-Kingston 332 m.		Lozier No. 2... 320 m.	Stearns 313 m.	316 m.
8—Allen-Kingston 382 m.		Lozier No. 2... 371 m.	Lozier No. 1... 359 m.	362 m.
9—Allen-Kingston 423 m.		Lozier No. 2... 417 m.	Fiat 411 m.	408 m.
10—Lozier No. 2... 465 m.		Fiat 462 m.	Lozier No. 1... 458 m.	457 m.
11—Lozier No. 2... 515 m.		Fiat 506 m.	Lozier No. 1... 504 m.	504 m.
12—Lozier No. 2... 565 m.		Fiat 556 m.	Lozier No. 1... 552 m.	553 m.
13—Lozier No. 2... 616 m.		Fiat 605 m.	Lozier No. 1... 601 m.	600 m.
14—Lozier No. 2... 664 m.		Fiat 650 m.	Lozier No. 1... 646 m.	650 m.
15—Lozier No. 2... 706 m.		Fiat 693 m.	Lozier No. 1... 691 m.	699 m.
16—Lozier No. 2... 755 m.		Lozier No. 1... 740 m.	Fiat 724 m.	746 m.
17—Lozier No. 2... 803 m.		Lozier No. 1... 781 m.	Fiat 771 m.	787 m.
18—Lozier No. 2... 849 m.		Lozier No. 1... 825 m.	Fiat 815 m.	826 m.
19—Lozier No. 2... 883 m.		Lozier No. 1... 870 m.	Fiat 860 m.	871 m.
20—Lozier No. 2... 928 m.		Lozier No. 1... 914 m.	Fiat 903 m.	909 m.
21—Lozier No. 2... 972 m.		Lozier No. 1... 960 m.	Fiat 950 m.	951 m.
22—Lozier No. 2... 1,016 m.		Lozier No. 1... 1,005 m.	Fiat 993 m.	995 m.
23—Lozier No. 2... 1,060 m.		Lozier No. 1... 1,048 m.	Fiat 1,039 m.	1,032 m.
24—Lozier No. 2... 1,107 m.		Lozier No. 1... 1,092 m.	Fiat 1,074 m.	1,079 m.

quise, for the first time in the race gave the Stearns its full head and stalled off the Simplex and Allen-Kingston from overtaking them. The referees allowed Ed Hawley to take the wheel of the Fiat in the last hours, though the rules confine a car to two drivers. Late in the race de Palma appeared as a driver on the Allen-Kingston, though Crane and Rippigill had been given to the press stand at the start as its crew. A wag put the query, "What, after all, are rules among friends?"

During Saturday evening Mulford was stopped frequently by the officials on account of the tail lamps of Lozier No. 4 being out. It cost the car a lot of lost time. During Friday evening, by the way, the Fiat was stopped several times for the same reason. In fact, the bunch at one time made six circuits of the track while the Fiat was engaged in argument and relighting in front of the stand. Some official called to the timers to score the Fiat with the bunch. The next day W. E. Searritt, then acting referee, heard of this and ordered 6 miles to be deducted from the Fiat's score.

The Thomas Flyer, a six-cylinder stock car, which had been put in practically for a demonstration, made good with a steadily maintained average of about 40 miles an hour. Its troubles were few. The water system was a bit leaky. The gear-shifting levers had to be tied to the high with a rope. The Garford had bad luck. The timing gears got out of kilter at one time and at another the pump shaft seized. The car was held up in camp at one time for 6½ hours at a single stretch.

Following the big race came a challenge and an acceptance, and with them the chance of a sweepstakes being embodied in the next 24-hour contest should one be promoted by the association. Paul La Croix was naturally a bit crestfallen at the Renault being put out of the race by accident so early as to cut off the car's chances of repeating or bettering the record performers of this make at Morris Park. He accordingly issued a challenge to any competitor in a future race to put up \$1,000 against his entry. Charles Singer, entrant of the Simplex, which held



BRUSH RUNABOUT, DRIVEN BY F. A. THINKLE, OF DENVER, CLIMBS PIKE'S PEAK UNDER ITS OWN POWER



PRESIDENT G. B. POLHEMUS, OF SANTA CLARA COUNTY AUTOMOBILE CLUB, AND PARTY IN WINTON SIX AT LICK OBSERVATORY

the lead for several hours in record time early in the contest, was quick to respond with an acceptance and suggestion that the third and fourth cars be also invited to compete in the sweepstakes.

As usual, a program of sprints and time trials was run in the afternoon prior to the start of the big race. Though close to 4,000 spectators gathered to see them, they did not pan out overwell. There were few entries and the waits between were tediously prolonged. W. Wells, in a 20-horsepower Palmer & Singer, was drummed up as a post entry to go against F. J. Davis in W. J. Coghlan's 15-horsepower Moon in a 5-mile race for stock cars selling from \$2,001 to \$3,000. It was a walk-

over for Wells, in 5:17 $\frac{1}{4}$. The 10-mile race for stock cars selling for \$4,000 and over was fairly well fought out. John Marquise in a 60-horsepower Stearns got the lead at the start from Paul Sartori in a 35-45-horsepower Renault and was never headed, winning in 10:51 2-5. A larger field promised a better race in the 50-mile free-for-all. It had four starters: F. J. Davis, 30-horsepower Moon; Laurent Grosso, 60-horsepower Stearns; W. Wells, 60-horsepower Palmer & Singer, and V. Rippigill, 40-horsepower Allen-Kingston. Grosso won with the Stearns as he pleased in 55:08, with Davis in the Moon second in 55:31.

C. B. Buckley, an amateur, essayed to drive the B. L. M. racer, which was originally built for the Vanderbilt and bought by him to compete at Ormond last winter, against Ralph de Palma in the Fiat Cyclone. De Palma was merciful and contented himself with winning by 50 yards in 5:11 1-5. Buckley's time was 5:19 4-5. De Palma during the afternoon made a couple of tries with the Fiat Cyclone to beat the Brighton Beach record of :54. On his first attempt he did :55 1-5 and on his second try :54.

During the 1 $\frac{1}{2}$ -hour intermission on Saturday afternoon de Palma and Buckley ran a match race, mile heats, best two in three. The Fiat pilot took the first and third heats and presented the second to the B. L. M. by inches, in 1:20.

The winning Lozier is a six-cylinder car rated at 50-horsepower, with cylinders of 4 $\frac{1}{8}$ -inch bore by 5 $\frac{1}{2}$ -inch stroke. Mulford's four-cylinder car has cylinders 5 $\frac{1}{4}$ inches "square." Both motors follow the usual Lozier design; cylinders cast in pairs and covered with pearl gray enamel; valves on opposite sides; crankshaft forged from chrome-nickel steel, running on ball bearings. Both have multiple-disk clutches and four-speed selective gearsets with direct drive on third speed. Drive to the rear axle is through a shaft with a single universal joint, housed in a tube which acts as a torsion rod. All wheels

are 36-inch, with 4-inch front and 4 $\frac{1}{2}$ -inch rear tires of Continental make. The wheelbase of the six-cylinder car is 131 inches and of the four-cylinder 124 inches. One detail which showed the careful preparation of the cars for the race was the arrangement of the tail lights, which were enclosed in the rear part of the bodywork, with only the red bullseye showing. The Bosch was the magneto used.

The Fiat motor develops 60 horsepower, with cylinders 140 by 135 millimeters—5.52 by 5.32 inches—cast in pairs with opposite valves. It was the only car in the race using low-tension ignition, the current being generated by a Bosch magneto. The change gear gives four speeds.

WEST'S BEAUTIFUL CLIMB

San Jose, Cal., Sept. 9—One of the most novel rides to be taken in a motor car in the west is from this city to the top of Mount Hamilton, on the crest of which rests the world-famous Lick observatory. The base of the mountain is some 15 miles from this city, where a steady rise begins. It is a long winding climb of several miles to the top of the mountain, with a grade that in places taxes a car. There is seldom a stretch of 100 yards that affords a straightaway view of the road, and it has been estimated by a frequent traveler of the road that there are between 400 and 500 decided turns in the road before the summit is reached, at an elevation of 4,400 feet above the sea's level. The view from bottom to top is magnificent. The car runs through many acres of pure orchards, with their white blossoms, whose beauty every year is celebrated by a blossom festival. Then the machine finds itself above these, and they form a great white quilt for miles around him. Gradually, as the car ascends, one secures a view of the entire Santa Clara valley, and in the distance, on one hand, the bay, and, on the other, the Pacific ocean. At the summit is the great observatory, to which the motorist is always welcomed by courteous attendants.

BRUSH CLIMBS THE PEAK

Denver, Colo., Sept. 11—The latest sensation in motor car durability is credited to a 1909 model B, Brush runabout, driven from Detroit to Denver, via Cincinnati, Kansas City, Colorado Springs, to the top of Pike's peak, down again and to Denver. The driver of the little car over these 2,275.6 miles in 22 days' running time is F. A. Trinkle of this city. In the entire trip he tightened but one fender bolt at Kansas City, and adjusted the chains twice. No adjustment of the carbureter was made at any time, nor was it necessary to clean or change the spark plug, he claims. While some very bad roads were encountered before the Pike's peak region was reached, occasioned by heavy rains, these were not a marker to the road up to the top of the peak. Coming down these had to be negotiated with the greatest nicety for some were on the verge of precipices. The ascent of the peak was accomplished in 7 hours. No mishaps occurred until the return trip; when 2 miles from the top a boulder ripped open the gasoline tank. A gallon was saved. The feed pipe was unscrewed and thrown over the dashboard, and into this with a squirt-gun the gasoline was fed by Mr. Trinkle's assistant for the balance of the trip to the bottom of the peak.

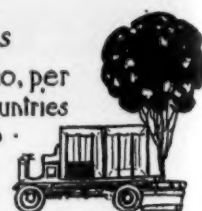


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Stronger Running Gears Needed

DURING the last 2 years the attention of motor car engineers has been so centered upon the perfecting of the motor, and coupled with the working out of a good transmission system, that many of the running gear parts of the car have been neglected, the result being that today not a few of the machines are poorly balanced, having too much motor and not enough other parts. This condition is borne out by the many road tests and other contests of the present season, in which cars have failed, not because of motor troubles, but due to a variety of chassis weaknesses. Many designers, while not increasing the bore and stroke of the motor, have claimed that they have succeeded in increasing its power from 10 to 15 per cent, yet these same designers apparently have forgotten that this extra motor power called for stronger wheels, strengthened axles, better spring suspension, stouter frames, improved steering facilities, and the proportional strengthening of a dozen other minor factors of the chassis make-up.

Glidden Tour Found Weaknesses

A CURSORY analysis of the car performances in half a dozen road races, a score of reliability trials, an equal number of hill-climbs, and other contests of varying nature, is sufficient to prove the weakness of not a few running gear parts. In the Glidden tour but three cars went out of the 1,000-mark class because of motor troubles, two of which were directly due to faulty construction and workmanship. In contrast with these is the following array of 1,000-mark eliminations: two for broken wheels, three for frame troubles, comprised chiefly of fractures of the side members, four for axle weakness, two for transmission difficulties, four for weak springs, one for brakes, and three others for minor chassis weaknesses. This enumeration is sufficient to show wherein lies the weak parts of the 1908 motor cars, but this is the record of but one contest.

Wheels Deplorably Weak

IN reliability contests extending over periods varying from 1 to 4 days, the evidences of weak running gear constructions are equally apparent. In the Harrisburg run broken wheels, broken springs and spring brackets, sagged front axles, and incapacitated steering gears comprise the chief sources of perfect score in eliminations. In the Minneapolis contest, the major weaknesses were in springs, wheels, and axles. The same is true of the Washington reliability run. The Toledo contest developed scarcely a motor weakness, but several in the chassis construction, and reliability runs in other sections brought out the same defects. Hill-climbs have proven conclusively that in a great many cars the wheels are too light, being suitable for ordinary speeds on straight courses, but entirely inadequate for speeding on curves.

Disappointed in Materials

DOUBTLESS, the cause of the oversight in the proportionate strengthening of running gears in comparison with motors may be found in the reliance the designers have placed in new steels marketed, many makers feeling confident that the employment of such steels, in the same sizes, would be sufficient to maintain the proportion with the increased motor power. As events have shown this has not been the case, and the running gears are still the weakest link in the car. Wheels, which have shown themselves deplorably weak this season, have been under size in many cases; and an examination of broken spokes at times of accidents has revealed the fact that many of the wheels are not of second growth hickory which the salesman has represented them to be.

Reduction in Factory Cost

WITH the reduction in price of cars, which the 1908 season ushered in and the 1909 and 1910 seasons give promise of a fair degree of fulfillment, comes the ever-present problem of reduction in the factory cost of the machine. Because of the reduction in tire prices, in many of the car appurtenances, and in other matters, the maker is able to make a commensurate cut in the selling price of the car; but in not a few factories this reduction could be increased and the books of the companies show at the end of the fiscal year an increase in savings because of a closer watch being kept on the factory departments, and the general *modus operandi* within the manufacturing plant. Not a few foreign companies have paid expert factory organizers as much as \$10,000 a season to devote their time to the organizing of the different departments of the factory, introducing systems for handling the rough and finished parts, introducing system for controlling the men, and introducing a proper progressive arrangement among the different departments of the factory.

New Factory Great Advantage

THE manufacturer who is so happily situated as to be able to erect a new factory, according to his own designs, can save thousands of dollars per year, by carefully surveying the factory area and locating such departments as milling, planing, automatic machinery, grinding, buffing, plating, etc., so that there is no overlapping in the progression of the material from the rough stage to the finished product.

Location of Assembly Departments

OF equal importance is the relative location of the finished stock room, in which the manufactured parts, that go to make up the motors, clutches, transmission, rear axles, steering gear parts, and control parts, are deposited after manufactured and where they remain until distributed to the departments where these parts are assembled into the completed engine, clutch, transmission, rear axle, steering gears, etc. If the finished stock room is remote from these assembly departments, much valuable time is lost by those artisans employed in the assembling of the different parts. A greater loss of time results if the stock room clerks have not system in gathering together the many parts that go to make up a motor, and seeing that these, as a unit, are transported to the motor assembling tables. Motor Age has noticed cases in numbers where the motor assembly men make trips to and from the finished stock room to secure parts that were not delivered to them as supposedly with the complete batch that comprise the motor. If proper system

Keep Close Check on Men

NOT a few cases are on record where thousands of dollars have been saved the factory by a system of careful control of the workmen. Experts in this regard have found it profitable to the factory to station a checker at the drinking fountains, particularly if these are in separate rooms, the checker's duty being to report the number of visits of each man per day and the time so occupied. Reports from these checkers have resulted in the discouragement of the short smoke, which so many workmen indulge in at such times. The result of this system has been days saved to the factory each week, and thousands of dollars per year. Small as this may appear, it is but one example of the many leaks in factory manufacture, and it is safe to assert that the employment of any American factory by an organization expert would permit of a reduction in the price of the factory's output, and at the same time an increase in the year's profits.

PARKWAY SWEEPSTAKES INSTEAD OF TRIAL

NEW YORK, Sept. 13—There will be no eliminating race to select a team to represent America in the Vanderbilt cup race, but the date set for the former event, October 10, will be used by the American Automobile Association to fittingly open the Long Island motor parkway, it having been decided to substitute for the eliminating trial the "motor parkway sweepstakes," in which will start cars of every class selling from \$1,000 up. They will all start together at 9 o'clock on the morning of October 10 around the Vanderbilt cup circuit of 25 miles. The larger cars will go the entire distance, ten laps, or 250 miles, and the smaller ones will go from four to eight laps, according to their selling price.

So far as the public is concerned there will be something doing at the grandstand every minute, since the scheme of starting all classes at once effectually removes a monotony which has prevailed at similar races where machines were started in bunches according to their selling prices. Up to this time it always has been impossible to start every class at once, but owing to the nature of the 1908 Vanderbilt cup course, which consists of about 11 miles of new and specially designed cement roadbed, it is now possible to let all of the cars get away simultaneously, or with 30 seconds intermission, and have a grand finish at the end of the 250-mile race between the higher-powered cars only. The smaller machines will go four laps, those selling between \$2,000 and \$3,000 will go eight laps, those selling between \$3,000 and \$4,000 and upward will go ten laps of the course.

The cup commission has offered the manufacturer more liberal conditions than have ever been given in a stock model event. The entrants must furnish evidence that the machine is of a type to be produced during 1909 or that has been produced in quantities during 1908, but touring cars will not be required to carry touring bodies or passengers. There is no restriction about mufflers except that they must not turn toward the ground, and machines can be geared for racing purposes. Exhaust mufflers may be removed if desired, together with all mudguards and other unnecessary equipment for a racing machine.

It is believed that this race will afford not only a very spectacular and exciting event for the public but it will bring forth all the speed which is claimed by the various makers this year. The grandstand which is being built for the Vanderbilt cup race on October 24 will be completed for the motor parkway sweepstakes, and special Long Island train and trolley service will be running just as they would have been had the Vanderbilt cup eliminating race instead of the new event been held on the 10th.

Novel Speed Contest as Substitute for Vanderbilt Eliminating Race—Electrics on Tours

The cup circuit is practically completed. All the bridges crossing intersecting highways on the cement parkway are up, oil has been ordered for the state and county roads which are to be used to complete the circuit of 25 miles, connecting both ends of the cement parkway, an elaborate telephone system for signalling and timing and reporting the positions of the cars on the circuit has been installed, and the boxes and seats in the grandstand are on sale. They may be obtained from Jefferson de Mont Thompson, chairman of the Vanderbilt cup commission, at the headquarters of the American Automobile Association, 437 Fifth avenue. The entry blanks for the motor parkway sweepstakes will be out this week. The preliminary announcement of the various classes of events, in which \$5,000 in prizes are offered, is as follows:

Class No. 1, Motor Parkway sweepstakes—For cars selling above \$4,000. Entry fee, \$150 for each car. Cash or plate prize to the winner of \$1,000. Distance, ten laps of the circuit.

Class No. 2, Meadow Brook sweepstakes—For cars selling over \$3,000 to \$4,000. Entry fee, \$125 for each car. Distance, ten laps of the circuit. Cash or plate prize of \$1,000 to the winner.

Coming Motor Events

Southwestern Reliability—Eight-day reliability run of Automobile Club of Kansas City, September 19-26.

Austria's Big Climb—Automobile Club of Austria's annual Semmering hill-climb, September 20.

Massachusetts Test—Bay State Automobile Association's 24-hour endurance run, September 23-24.

Four-Inch Race—"Four-inch race" for Tourists' trophy, on Isle of Man, September 24.

Milwaukee Meet—Second annual track meet of Milwaukee Automobile Club, September 25-26.

Voiturette Race—Voiturette contest promoted by French L'Auto, September 27.

Michigan's Tour—Annual contest tour of Michigan State Automobile Association from Grand Rapids to Detroit and return, September 27-29.

Indianapolis Run—Two-day reliability run at Indianapolis, October 1-2.

Thousand-Mile Reliability—Chicago Motor Club's 1,000-mile reliability run, postponed from June, October 6-9.

Fairmount Park Road Race—Quaker City Motor Club's 200-mile road race in Fairmount park, Philadelphia, October 10.

Parkway Opening—Series of sweepstake races to mark opening of Long Island motor parkway instead of Vanderbilt eliminating trial, October 10.

Road Congress—First international road congress and exhibition in Paris, October 11.

Cleveland Reliability—Three-day reliability run of Cleveland Automobile Club, October 14-16.

Vanderbilt Cup Race—Vanderbilt cup race on Long Island motor parkway, October 24.

Light Car Race—Automobile Club of America's light car race at Savannah, Ga., November 25.

Grand Prize Race—Automobile Club of America's grand prize race at Savannah, Ga., November 26.

Class No. 3, Garden City sweepstakes—For cars selling from \$2,001 to \$3,000. Entry fee, \$100 for each car. Distance, three laps of the cup circuit. Cash or plate prize of \$1,000 to the winner.

Class No. 4, Jericho sweepstakes—For cars from \$1,001 to \$2,000. Entry fee, \$75 for each car. Distance, six laps of the cup circuit. Cash or plate prize of \$1,000 to the winner.

Class No. 5, Nassau sweepstakes—For cars selling for \$1,000 or under. Entry fee of \$50 for each car. Distance, four laps of the cup course. Cash or plate prize of \$1,000 to the winner.

Electrics on Long Tours

Chicago, Sept. 15—Makers of electrics are conducting a campaign to educate the public as to the touring possibilities of their cars. The Detroit recently traveled from Detroit to Atlantic City, a distance of 1,069 miles; now the Woods and Babcock are giving demonstrations of their possibilities. The Woods started from Chicago August 26 for Lincoln, Neb., and yesterday it was reported that the car had reached there with the odometer showing 1,213 miles. It may be the electric will be sent on for a 200-mile mark. The Babcock victoria, driven by F. A. Babcock, Jr., manager of the Chicago branch, is making a 1,000-mile journey through the state. He was reported at Galesburg yesterday, having covered 300 miles, in which distance he had visited many towns whose inhabitants were astonished by the performance of the electric. After leaving Galesburg the Babcock will continue on its circuitous route, visiting Peoria, Bloomington, Lincoln, Springfield, Decatur, Champaign, Danville, Kankakee, thence back to Chicago. The tour will occupy 3 weeks, the car remaining in each of the important towns 1 or 2 days in order to give demonstrations.

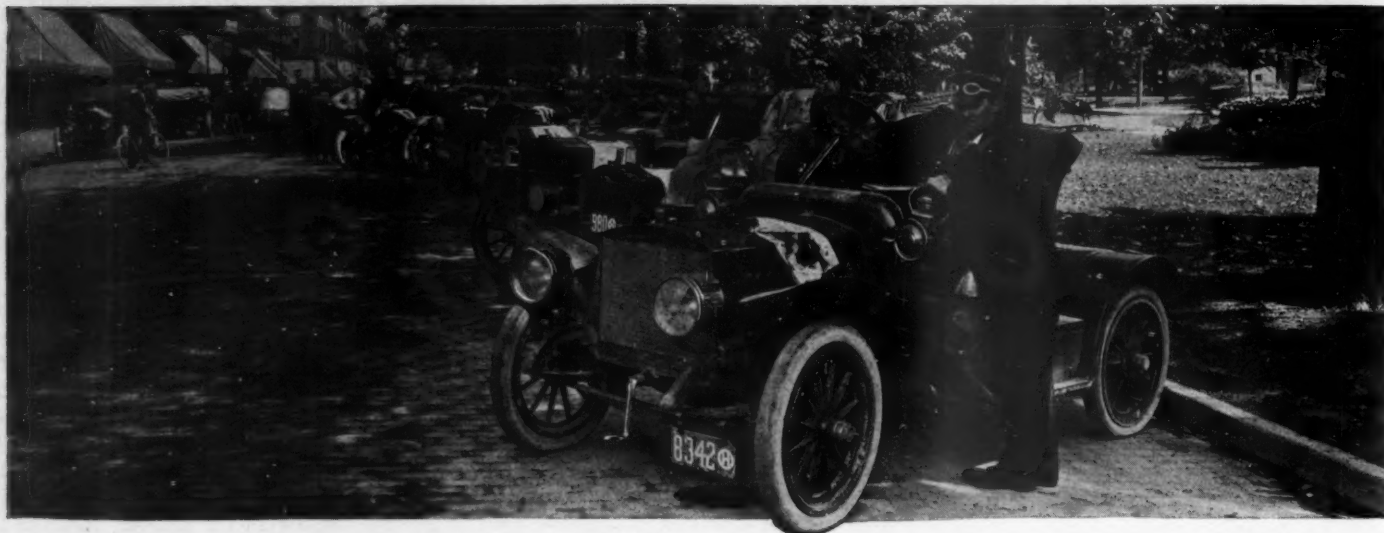
Badgers Hold State Meeting

Milwaukee, Wis., Sept. 14—The Wisconsin State Automobile Association went on record at the annual meeting on Wednesday last as being in unqualified favor of a national license law for motor cars. Individually, members of the club have long urged the passage of such a law and since the endorsement by the A. A. A., the first opportunity for such action was the annual meeting.

The following directors were elected: Neal Brown, Wausau; James T. Drought, Milwaukee; C. O. Josslyn, Oshkosh; M. C. Moore, Milwaukee; George A. West, Milwaukee; Frank P. Hixon, LaCrosse; A. R. Barker, Portage; F. H. Blodgett, Janesville; C. Roy McCanna, Burlington; H. L. Halvorsen, Whitewater; Senator James A. Wright, Merrill; Henry N. Boehm, LaCrosse; A. J. Horlick, Racine; F. A. Chadbourne, Columbus. Two new clubs were admitted, LaCrosse, with sixty members; Monroe, with forty members.

The good roads topic was one of the most important ones discussed at the convention. The time was well selected, as the Wisconsin state fair was in session from September 7 to 11.

EIGHT PERFECT IN OHIO'S 3-DAY RELIABILITY



RELIABILITY

CARS IN OHIO'S RELIABILITY RUN LINED UP IN CONTROL AT SANDUSKY

TOLEDO, OHIO, Sept. 12—Toledo's first 3 days' reliability run between Toledo, Columbus and Cleveland, was a success, eight finishing with perfect scores out of fifteen starters.

From every possible point of view the run was a grand one and with the single exception of the unsettled question as to what to do with Atwood's Stoddard-Dayton entry there wasn't a hitch to mar the contest from beginning to end.

Every sort of road was encountered to make it a thorough test with the rough dirt roads on the first day, the high rocky hills with their winding paths and thank-you-ma'ms the second day and almost hub-deep sand the last day. All are agreed that it was a tough run and two or three who have driven several Glidden tours say that the 3 days were harder than any 3 days in any Glidden tour ever held.

The first day's run to Columbus via Findlay, Marion and Delaware cut down the perfect list by two. Gideon Spicker, driving a Stoddard-Dayton in the amateur class, took a hill downwards at a high speed and lost the road in turning around a buggy. Unable to get back and headed for a ditch, he tried to make a right-angled turn into a side path and smashed his front right wheel so badly a new one had to be brought on from the factory in Dayton. C. W. Kelsey had trouble with

his Maxwell model D owing to dirt lodging in the carbureter and was forced to take a penalty after he had actually reached the checking point in Columbus. He was just starting up to cross the line when his motor failed to work.

Wednesday morning, when Atwood started out with his Stoddard-Dayton entry in the professional class, he discovered that the interlock and sleeve on the high and intermediate gears had been broken and his gear shift lever had been bent by somebody falling on it in crossing over his machine. He was advised by Referee Davis to get a new part and proceed while the matter was taken under advisement. This he did, leaving about noon after the factory had sent over the wrong part and he had made a temporary repair. This repair gave way shortly past Mount Vernon. Wedging his high gears in with a crowbar he made the balance of the run in spectacular fashion on the high gear. This was a wonderful piece of work as the hills and sand were awful and many of them he had to climb 3 feet at a time by racing his engine and jamming in the clutch till the engine was ready to stall, then taking it out and racing the engine again. The car was given a terrible amount of abuse but went on through without a falter.

On this same day's run C. G. Bleasdale

in a Maxwell dropped over a thank-you-ma'm onto a hidden stone in such fashion as to break his steering gear—one of the parallel rods. It looked as if he were out but by pulling off one of the most wonderful stunts ever done he managed to get through to Toledo and back to Cleveland after the run. Disconnecting his emergency brake lever from the brake rod, Bleasdale fastened the lever to the steering gear lever by means of a willow sapling that he trimmed and cut and wired onto both parts. With this sapling wrapped and bound to the gears as his only means of steering, Bleasdale finished the run and got back to Cleveland, a distance of more than 400 miles. It was a marvelous performance and as he entered each control on actual running time, pushing and pulling his emergency brake lever to steer his car he was cheered to the echo.

This second day also cut down the Mitchell entry which had coil trouble. The model L. C. Maxwell burned out his plugs and stripped the sockets.

The showing of the Mora, entered by Frank H. Adams, of Cleveland, was as clean a bit of work as made by any car. Adams was lucky enough to not even have any tire trouble except a slow leak that caused him to pump up one of the rear tires three or four times. Except for this, all that was done to the car was simply to keep it running on the road. Aside from this fact, the car deserves credit because when the Pope-Toledo was laid up with a multitude of tire troubles, the Mora took the confetti and finished the run as confetti car. Notwithstanding the fact that this means a series of delays all along the line that meant practically an hour or so lost time every day, in addition to carrying extra weight, this car finished perfect and within its scheduled time at every control.

Andy Auble, Jr., in his Oldsmobile in the professional class, and E. R. Torgler,

RECORD OF CARS IN TOLEDO-COLUMBUS-CLEVELAND RELIABILITY

Name of car	H.P.	Cyl.	Piston bore	Stroke	Car model	Entrant	Driver	Final standing
Mora	50	4	5 1/2	6T	F. H. Adams	Adams	1000	Perfect
Jackson	35	4 1/2	4 1/2	E	Jackson Auto. Co.	Scheffler	1000	Perfect
Jackson	35	4 1/2	4 1/2	E	C. D. Paxson	Paxson	1000	Perfect
Brush	7	4	4	R	Brush Runabout Co.	Huss	1000	Perfect
Reo	20	4 1/2	6	TC	H. J. Adams	Adams	1000	Perfect
White	50	4 1/2	4 1/2	K	White Co.	Phillips	1000	Perfect
Oldsmobile	40	4 1/2	4 1/2	1909	Olds Motor Works	Aubel	1000	Perfect
Oldsmobile	40	4 1/2	4 1/2	1907	E. R. Torgler	Torgler	1000	Perfect
Mitchell	20	4	4	1909R	W. H. McIntyre	McIntyre	973	
Chalmers-Detroit	30	5	4 1/2	30	Chalmers-Detroit Co.	Machesky	973	
Maxwell	20	5	5	HC	Maxwell-Briscoe Co.	Bleasdale	705	
Maxwell	28	4 1/2	4 1/2	D	Maxwell-Briscoe Co.	Kelsey	542	
Stoddard-Dayton	35	4	5	9A	Atwood Auto. Co.	Atwood	No decision	
Maxwell	12	4 1/2	4	LC	Maxwell-Briscoe Co.	Weger	Withdrawn	
Stoddard-Dayton	45	4 1/2	5	8K	G. Spicker	Spicker	Withdrawn	

in an Oldsmobile in the amateur class, kept up the reputation of their cars in classy style. Shy C. Fisk was pleased beyond expression at the splendid showing of the White steamer, which never faltered once and which was held up for tire trouble only once. The surprise of the run was caused by the little Brush runabout which negotiated every foot of the way in a perfect manner and finished without the suggestion of a penalty. This is considered remarkable, for when it is remembered that this car carried only a 7-horsepower single-cylinder engine the fact that it climbed the hills and worked through the awful sand seems incredible. But it did and every time it showed up it was cheered to the echo. Dwight Huss, its driver, was about the happiest man in the run.

If there was one car that was penalized that certainly had a tough break in the luck bag it was the Chalmers-Detroit, driven by Machesky. This car was penalized for being late, a condition brought about by the bugbear tire trouble. But so far as the car and its operation was concerned, there wasn't the slightest cause for penalty. The car had a perfect score up till the last day and in fact up to within the 3 miles from Sandusky, the noon control. When this point was reached they had already made five tire changes and still had 8 minutes to make the mile—an easy performance. B. O. Gamble had just settled back with a sigh of relief after noting that he had so much time to make the short distance, when with a whiz away went another tire. That simply put them down and out and they had to take a penalty at the noon control. The remainder of the trip was in perfect time and order.

W. H. McIntyre in his Mitchell was also a victim of circumstances in that he had coil trouble that could not be located in time to save him a penalty. Before he actually discovered just what the trouble



STODDARD-DAYTON WHICH MADE A COMPULSORY HIGH GEAR RUN

was he had taken a penalty for changing a spark plug which didn't require any attention at all. Then after this he discovered the faulty coil and adjusted it with a subsequent penalty. But so far as any other part of the car was concerned, there wasn't a bit of trouble and the run was reeled off like a top.

The Maxwells drew a lot of grief and trouble in two cases because of faulty plugs, and in one case because of a hidden rock. The model L. C., driven by Weger, burned out both spark plugs at Sanbury and because it would have been impossible to get others in time the car was left there and withdrawn. Kelsey in the model D was first penalized because his gas feed became clogged with dirt from his gasoline, and then later because of spark plugs going bad on him. Then on the third day he had all sorts of tire trouble, finally ending up by running in with flat

tires. Doing this caused him to break a spring, for on striking a big bump it let the car down with enough shock to snap a leaf and cause trouble.

ON TOUR ACROSS CONTINENT

Chicago, Sept. 15—A trip across the American continent from the Pacific coast to the Atlantic in a two-cylinder Reo roadster is the stunt undertaken by George Pierce, of San Diego, Cal., and his wife; who yesterday arrived in Chicago after a 2,900-mile journey which was beset with difficulties which would have tried the mettle of even the New York-Paris racers. Mr. Pierce disposed of his interest in San Diego and decided to return to New York and the motor trip appealed to him. In no hurry he pursued a leisurely course across the continent, stopping at several cities, but averaging about 100 miles a day when on the road. His actual time for the 2,900 miles to Chicago was 20 days and his course carried him through Los Angeles, Sacramento, Carson City, Ogden, Cheyenne, Omaha and Council Bluffs. His car is shod with Michels and until he got past the rough going he had on tire casings. He got his first puncture at Omaha. The only mishap to his car was when a rock broke the apron while running through Nevada. The sage brush bothered him some and he relates of more than one instance where he had to run 25 miles at a stretch on his low gear because of these weeds on the crown of the road.

MUST REMOVE STONES

Philadelphia, Sept. 14—For failing to keep their roads clear of stones and holes the councilmen of Dickson City and Old Forge have been notified by the Scranton, Pa., Automobile Association that warrants have been issued for their arrest. Notes of warning have also been sent to the authorities of other towns roundabout Scranton that similar action will be taken against them unless they "get busy."



BLEASDALE'S MAXWELL WITH IMPROVED STEERING GEAR

KNOX CAR FASTEST ON WILBRAHAM HILL



MANY CARS WERE LINED UP ALONGSIDE COURSE AT HILL-CLIMB AT SPRINGFIELD, MASS.

SPRINGFIELD, Mass., Sept. 11—The annual hill-climb of the Springfield Automobile Club, which was held today on Wilbraham hill, hardly can be classed as successful because of the scarcity of entries. Outside of Springfield there were not a half-dozen entries all told; some of the events did not attract even one car and others got but one or two, consequently there were several walkovers. Fred Wagner and Charles Gillette were here and they hustled the climb off in good shape, otherwise the meet never would have been ended before dark. As it was, the last event could not be considered as finished, as the Buick and one of the Stevens cars did not get a chance at the hill because of the people swarming onto the course on their way down the hill.

It was an interesting climb, nevertheless, and when the totals were figured up it was found it had been a battle between the Knox and the Stevens-Duryea. The Knox made the best time, but the Stevens won the larger number of first prizes, getting seven, as well as one third place. The Knox won four firsts, six seconds, one third and one fourth. The Buick won twice and a Jackson once. Basle in the Knox that

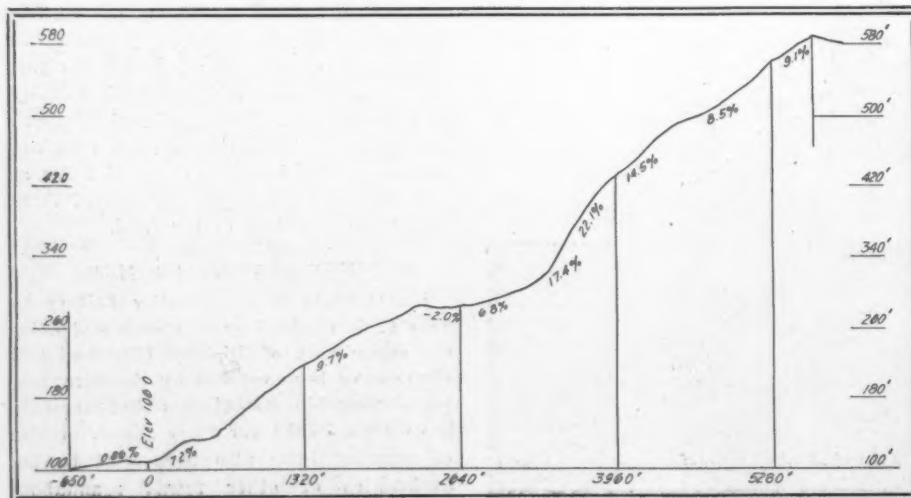
is entered in the Vanderbilt registered the best time of the motor cars with 1:08, but it was Stanley Kellogg on an Indian motor cycle who skimmed up the incline at the greatest speed, registering 1:03 4/5. The hill, which is 10 miles from Springfield, is just 1 mile long. It starts at a 7 per cent grade, then goes to 9. It sinks a bit then to 6 per cent for a few hundred feet, then goes to 17 and 22 per cent, gradually lowering to 14 and 9 at the finish. The grades are short, too, so they fooled the drivers. Some of the big cars did it on the high because they were geared low especially for it. Others took it on the second and more had to shift and nearly stalled doing it. The curves, too, were bothersome.

Peter Robinson and his six-cylinder Stevens-Duryea furnished the excitement when the car turned turtle, throwing Robinson out and giving him a miraculous escape as well as scaring the onlookers mightily. Robinson had been up the hill a few times and he had made splendid time, so when he cut loose in event 16 he was out to break records. It seemed certain that the time was about to be lowered the way he flew like a shot from a gun

when the word was given at the tape. Up the first little rise he went without a falter. Then came the second and it may as well not have been there as far as his car was concerned, for the machine took it easily and then swung around the curve. The tremendous speed made it hard to control the car and it swerved over on the narrow road a bit and side-swiped a woodpile, sending the logs helter skelter. The people leaped back amazed.

The hitting against the logs threw the car off its balance and it made a dash to the left, but Robinson pluckily stuck to the wheel and by a herculean effort prevented it going into the bank. Then it shot diagonally across to the other side and he swung it again. The car was now like a maddened horse that had the bit in its teeth and again it started on its career off the road and this time turned completely around. Robinson was thrown out and the car rolled over on its side in the ditch. There was a rush to Robinson's assistance and among those who were present were some physicians. They patched him up temporarily. His right leg was broken below the knee, there was a bad gash in his head and he was bruised all over. Harry Fiske took him to a hospital in his car. When he was being taken away he got a tremendous cheer, for he was a great favorite with the crowd. He was conscious all the time, but never murmured though suffering.

This accident put a damper on the enthusiasm, and the other drivers that followed did not do any record-breaking, though they were expected to. It took the heart out of them. It was near the close of the day's racing anyway, so it did not matter so very much except that it robbed the spectators of seeing a fast dash by Baldwin in a Stanley steamer. He had the car that broke the record at Worcester and he had waited patiently all day for his trial. When he got ready there were a lot of people on the course and he said it took the heart out of any driver to see



MAP SHOWING GRADE OF WILBRAHAM HILL AT SPRINGFIELD, MASS.

them and no doubt it interfered with his speed, for when he finished the laurels went to the gasoline cars. Summary:

CARS 40.1 TO 60 H. P.			
Car	H.P.	Driver	Time
Stevens-Duryea	56	Robinson	1:10 1-5
CARS 24.1 TO 40 H. P.			
Stevens-Duryea	36	Hancock	1:22 3-5
Knox	30	Denison	1:35 2-5
Buick	34	Burman	1:35 3-5
Chalmers-Detroit	40	Orndoff	1:35 4-5
Knox	38	Bourque	1:37 3-5
Bailey		Bailey	2:26 1-5
CARS 15.1 TO 24 H. P.			
Buick	16	Burman	2:14 3-5
Cameron	22	Cameron	2:15 1-5
CARS \$850 AND UNDER			
Cameron	16	Cameron	2:24 3-5
Middleby		Smith	5:17 1-5
CARS \$851 TO \$1,250			
Buick	22	Burman	2:12 4-5
Cameron	16	Cameron	2:17
Middleby		Smith	3:41 4-5
CARS \$1,251 TO \$2,000			
Jackson	24	Blake	2:01 4-5
Cameron	24	Cameron	2:13 1-5
CARS \$2,000 TO \$3,000			
Knox	38	Bourque	1:26 3-5
Knox	30	Denison	1:35 2-5
Chalmers-Detroit	40	Orndoff	1:47 2-5
Bailey		Bailey	2:25 2-5
CARS \$3,001 TO \$4,000			
Stevens-Duryea	36	Hancock	1:23 2-5
CARS \$4,000 AND OVER			
Stevens-Duryea	54	Robinson	1:10
PISTON AREA 50 SQ. IN. AND UNDER			
Atlas	34	Ruggles	2:34 3-5
Bailey		Bailey	4:00 2-5
PISTON AREA 50 TO 65 SQ. IN.			
Knox	30	Denison	1:40
Cameron	24	Cameron	2:11 4-5
Buick	22	Burman	2:12 2-5
Bailey	63	Bailey	
PISTON AREA 65 TO 90 SQ. IN.			
Stevens-Duryea	36	Hancock	1:18 3-5
Knox	38	Bourque	1:28
PISTON AREA 90 SQ. IN. AND OVER			
Stevens-Duryea	54	Robinson	1:09 4-5
FREE-FOR-ALL GASOLINE			
Knox	48	Basle	1:08
Knox	38	Bourque	1:09 4-5
Stevens-Duryea	36	Hancock	1:16 1-5
FREE-FOR-ALL GASOLINE STOCK CARS			
Stevens-Duryea	36	Hancock	1:22
Knox	30	Denison	1:36 3-5
CLUB CHAMPIONSHIP			
Stanley	30	Knudson	1:23 4-5
Knox	38	Hedstrom	1:39 3-5
FREE-FOR-ALL RECORD TRIALS			
Knox	30	Denison	1:09 3-5
Stanley		Baldwin	1:11 2-5
Knox	48	Basle	1:12
MOTOR CYCLES 30.5 CU. IN. AND UNDER			
Indian	4	Gustavson	1:24 1-5
Indian	4	Kellogg	1:29 2-5
Indian	4	Lake	1:50
MOTOR CYCLES 61 CU. IN. AND UNDER			
Indian	7	Kellogg	1:03 4-5
Indian	7	Gustavson	1:09 2-5
Indian	7	Lake	1:13 2-5
N. S. U.	7	Shotwell	1:23 4-5
MOTOR CYCLE RECORD TRIALS			
Indian	9	Des Roches	1:07 1-5
Indian	9	Des Roches	1:11 3-5

RACE GOES TO THOMAS

J. H. McDuffee Withdraws Protest Against Flyer and Peace Now Prevails in Denver

Denver, Colo., Sept. 11—J. H. McDuffee, who entered the Chalmers-Detroit Bluebird in the Labor day races and secured second place 11 minutes behind the winner, withdrew his protest against the Thomas car the day after the race at a meeting of the board of governors of the Denver Motor Club. The protestant claimed that the Thomas Flyer had been repaired by others than the driver and mechanic. At the meeting allegations were made that others had violated rules in a similar way. It also was shown that McDuffee's car finished the race minus the mechanic; the rules required that mechanic and driver must both finish.

Harry Ball, who drove the Thomas car, is but 20 years old, and this was his first race. The Denver Motor Club paid over to him his \$500 prize money on Tuesday morning following the race. He is now aspiring to drive in the Vanderbilt cup race. J. Melbourne MacDonald, who was Ball's mechanic, is 19 years of age, and what he does not know about a motor car is not worth knowing. He is also blessed with an extra amount of nerve, as evidenced when, while the car was tearing along at a 50-mile clip, he crawled out over the engine, took out the spark plugs, cleaned them and replaced them. This little tinkering resulted in covering the succeeding lap in 17:45, as against 20:38 for the one before.

It takes a gamey man to drive a racing car under the most favorable conditions, but the man who has nerve enough to drive one without a mechanic to help or a decent seat on which to sit—the man who steers with one hand and pumps with the other in a flying, bumping car—must be lots more gamey than the average, and that was the consensus of opinion regarding L. B. Lorimer, of Detroit, who drove the Chalmers-Detroit

in the Labor day race, for after the sixteenth lap he had no assistant, the latter having been dumped out with the seat when the car swerved into a ditch.

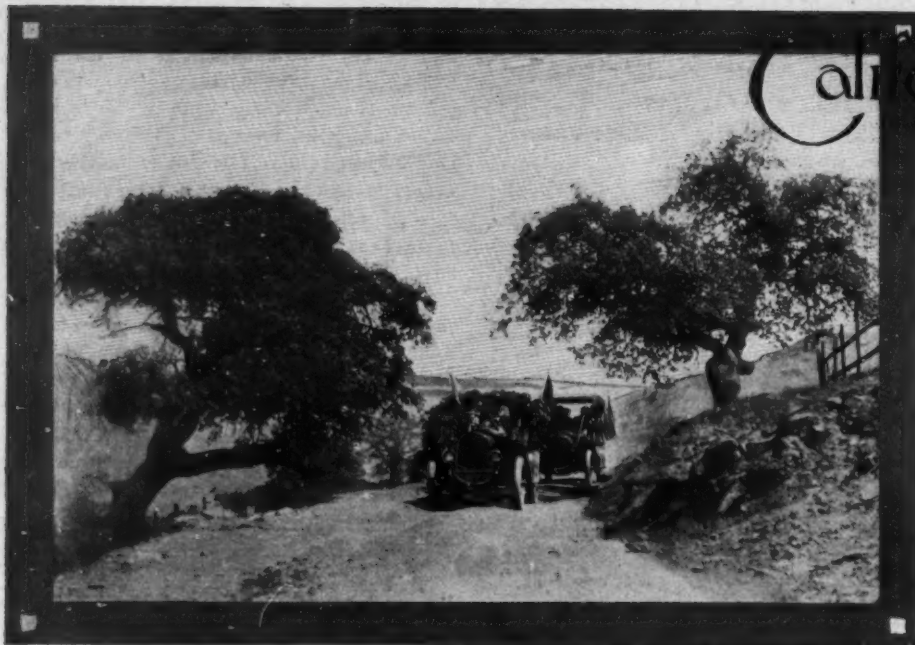
Both the White steamers in the Denver Labor day race were perfectly new stock models just taken from the train the day before without a chance to work out before the race sufficiently for them to be at their best. White No. 4 changed tires twelve times on account of punctures, and White No. 5 broke a connecting rod in the second lap. Examination proved the rod to be defective. The Colburn Thirty, driven by H. B. Colburn, the elder son of the builder, and which crashed into a telergraph pole when coming down the finish stretch in the nineteenth lap, is the same car that went through the fence at Overland park in a practice run the day before the Labor day races of last year. It was then driven by another son of the builder, and he sustained some very painful injuries. At that time the damage to the car was not as great as this time, although \$200 will repair Tuesday's breaks. Examination showed that one of the steering rods had broken, and furthermore that it had been broken a year ago and only welded. Having been painted over, inspection after being turned back to the salesroom hid this defect. E. H. Colburn, the builder, declares he will not enter another race unless the course is securely fenced off, thus keeping people off the track. It was a miracle no one was killed.

MEET AT POTTSTOWN

Philadelphia, Pa., Sept. 15—On Saturday, October 3, there will be a series of races on the mile trotting track at Pottstown, Pa. The promoters of the affair are Philadelphia newspaper men, and the feature of the program will be an attempt on the 100-mile track record. Pottstown is the home of the Chadwick car, and it is expected that Willie Haupt, who now holds about all the hill-climbing records in the east worth possessing, will make an effort to add to his list the circular track century, taking advantage of the occasion to give his Vanderbilt Chadwick a thorough try-out on this track.



GENERAL VIEW OF THE START OF THE CLIMB ON WILBRAHAM HILL AT SPRINGFIELD, MASS.



TOURISTS TAKING THE GRADE AT PACHECA PASS

LOS ANGELES, CAL., Sept. 10—In the tour of the Tourist California has furnished one of the most unique tours and motoring contests of the year. The Glidden tour was a contest of skilled drivers and mechanics; in the California tour twenty-six cars, all of one make, left Los Angeles to travel 1,100 miles to San Francisco and return. Most of these cars were driven by private owners and they carried women, children and baggage. Of the twenty-six which started twenty-one completed the long tour on schedule time, not 1 hour elapsing between the arrival home of the first and last car. Of the five which failed to return four owners remained in the north for personal reasons and not through any fault of their cars. The purpose of the promoters of this run was to demonstrate that private owners and their families could enjoy long tours. It more than fulfilled its purpose.

The tour was the idea of J. S. Conwell, general manager of the Auto Vehicle Co., a Los Angeles concern which manufactures the Tourist car. It was a reliability run, the officials being Los Angeles newspaper men. Entries were limited to the one make and machines of several models were represented. There were two and four-cylinder runabouts and touring cars and one 1905 four-cylinder car successfully completed the long tour. Twelve cars were awarded perfect scores, which was a truly remarkable showing. This meant that for 8 days of traveling over many ranges of mountain and miles of desert road in addition to the stretches through the gardens which make this sun-kissed land a perpetual Paradise twelve machines made sixteen controls on schedule time.

When Mr. Conwell issued his first announcement of the tour motorists generally on the coast predicted a failure. He was

told it would be found impossible to take amateur drivers with their families over the most dangerous grades in California. To ask the motorists to make a 1,100-mile tour of California was considered too big an undertaking for many. But Mr. Conwell had faith in the plan. He believed it could be carried out successfully and through his untiring efforts one of the greatest stunts ever pulled off by a factory was the result. All credit for this really great tour is due Mr. Conwell.

The official scores issued by the judges gave perfect cards to the following owners and drivers: Walter Sahland, G. W. Lull, J. S. Conwell, V. S. Beardsley, Mrs. W. J. Burt, B. H. Dyer, R. M. Bowser, J. F. Hubbard, W. D. Newerf, W. N. Congdon, C. A. Dundas, J. B. Gooch, and special honorary scores to George Kussman and Hugh McGillvray. The two last

named were the repair and Goodyear tire cars. These machines lost no time other than stops made to assist others. A repair car which was prepared to take care of any disabled machine and two tire cars, a Goodyear and Goodrich, brought up the rear. The Goodrich car skidded off the road the first day out but after being repaired completed the trip. There were no accidents of any consequence to mar the run and not one car was disabled so it was unable to continue.

The tourists were gone 12 days, there being stopovers at San Francisco and Del Monte. The night stops on the up trip were made at Bakersfield, Fresno and San Jose, and the return at Del Monte, Pasa Robles, and Santa Barbara. The average was well over 100 miles a day. Leaving Los Angeles the route was out the San Fernando road through the towns of Fernando and Burbank and over the famous Newhall grade. This is the worst grade in California. All cars went up successfully. Soon after topping this pass over which General Fremont brought his army in the early days, the cars entered the San Francisquito canyon. For 20 miles the small stream was crossed and recrossed, the cars climbing gradually upward. After a stretch of rolling country the tourists had a taste of desert, to be followed by the Tejon pass, another grade with a steep ascent. Luncheon was under the trees at Gorman, a mountain town of one house and two barns. For 30 miles in the afternoon the tourists suffered the only heat of the trip. From Rose Station to Bakersfield there is a flat, hot plain and the mercury flirted with the 100-mark



CARS CROSSING THE DRY BED OF THE SALINAS RIVER

constantly. At Bakersfield a reception was tendered the visitors in the evening and all had cause to remember the town and its hospitable inhabitants with pleasure.

The noon stop the next day was Hanford, in the heart of the vineyard district, and the whole town turned out to extend a welcome here. The mayor and a reception committee came out in motor cars and met the advance guard. They were led into the city and under the trees in the town park speeches of welcome were made and luncheon was served. The visitors were loaded down with delicious fruit and heartily gave three cheers for the enterprising little town of Hanford. The night stop was at Fresno.

The next day was another of warm receptions. At a little town called Dos Palos the visitors were surprised to be greeted by a committee in motor cars. In the town decorations had been put up and the women of the town served cider, punch, lemonade and fruit. Everywhere the farmers greeted the motorists with cheers and one old rancher was so carried away by his enthusiasm that he stood at his gate firing a salute with his shotgun for every passing car. At San Jose a band concert was given in the evening. From Fresno to San Jose was a 160-mile drive over the Pacheco pass.

One of the most beautiful runs of the tour was the 50 miles from San Jose into San Francisco. Side trips were made to Stanford university and the beautiful country home district of the San Francisco millionaires at Burlingame and San Mateo. A large delegation met the tourists 14 miles out of San Francisco and the



ON STEEP SAN JUAN HILL, 100 MILES OUT OF SAN FRANCISCO

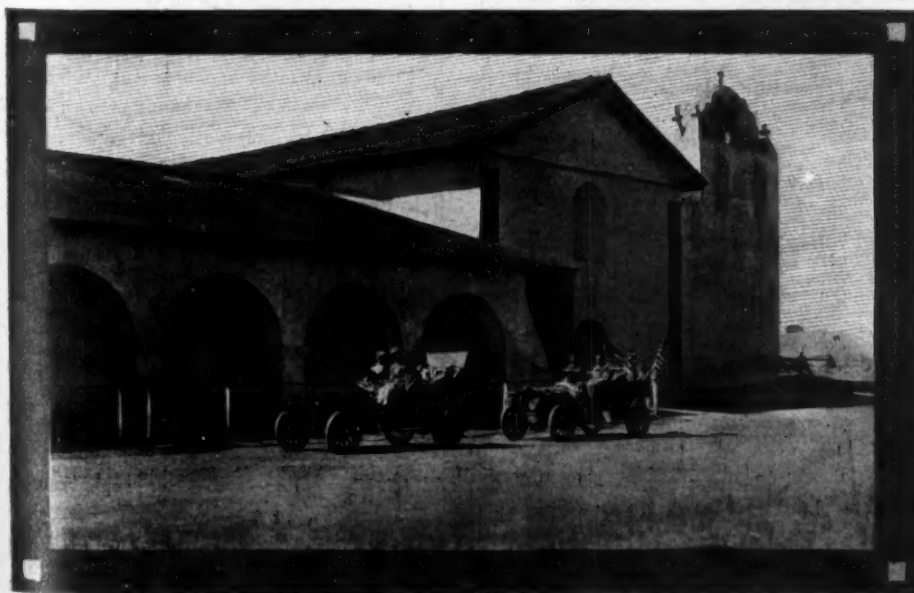
fifty cars rolled into the Golden Gate city.

San Francisco was reached Saturday afternoon. The return trip started Tuesday morning. The run that day was 125 miles to Del Monte, on the bay of Monterey. It was necessary to climb the San Juan grade. After a day at Monterey the cars ran to Pasa Robles and then went 160 miles over two mountain ranges to Santa Barbara. It was 110 miles home.

COAST ENDURANCE RUN OFF

San Francisco, Cal., Sept. 9—The 500-mile endurance run between this city and Los Angeles, in southern California, which was planned by the Automobile Dealers' Association of Northern California for the present month, has been called off. Apparent lack of interest among the dealers upon whom the entire success of the contest depended was the cause for the de-

cision of the association to abandon the affair. The general position of the dealers was that the run would prove too costly an affair for them to bear upon their own shoulders, and the prospects of securing any assistance from the factories in the east were not bright. It was planned to make the run in 2 or at most 3 days, and the expense of proper preparation appeared more than proportionate to the gains that might come from a perfect score. In spite of the fact that a number of events scheduled by the dealers' association early in the season have not been pulled off, the organization has by no means been at rest. A 24-hour race on the roads of Alameda county, the first ever held in this state, and a number of endurance runs and other affairs have been successfully held, and these, in conjunction with the activities of the Automobile Club of California, have furnished the motor car dealers and owners with plenty of work and promoted the game by the wide publicity that has been given by the press. The season probably will be closed with a run to Lake county, which contains some of the most beautiful scenery to be found in the western United States. It is a veritable garden spot, already the Mecca of the motorists of central California. California's greatest motor car race meet on a circular track will be held on Sunday afternoon, September 20, and great preparations are being made for the event. The affair is under the management and auspices of the Olympic Club, a general athletic organization, and will be held on the Tanforan horse track, which is just across the San Francisco county line in San Mateo county. This meet was inaugurated last year by the Olympic Club, and the large attendance of close to 10,000 people showed the remarkable interest of the general public in this class of sport.



TOURISTS STOP IN FRONT OF THE SANTA YNEZ MISSION

SUGGESTIONS FOR THE MAN WHO DRIVES

THE first six cases of this table appeared in September 10 issue. All dealt with the failure of the motor to operate, either on account of faulty assembling or of defects in the carburetor or battery ignition. In the following cases are considered further reasons for the failure of

EDITOR'S NOTE--Part II of a paper prepared by Thomas J. Fay, E. E., president Society of Automobile Engineers.

the motor to operate; reasons for noisy running; faults in the clutch and transmission, and, finally, causes for excessive cost of maintenance. The same course of

procedure is followed; the known quantities or symptoms are first verified, and then, one by one, the unknown quantities are eliminated until the cause of the trouble appears. The known quantities are certain of identification; the unknown sequences.

Case No. 7—Motor Will Not Operate KNOWN QUANTITIES INVOLVING THE MAGNETO

- 1—Compression is normal
- 2—Carburetor in normal state
- 3—Timer in good order, battery ignition side
- 4—Battery ignition wiring in good order
- 5—Battery in good order
- 6—Spark coil in good order
- 7—Spark at the spark plugs
- 8—Magnet system will not work

UNKNOWN QUANTITIES INVOLVING THE MAGNETO

- 1—Defective spark plug?
- 2—Soot on spark plugs?
- 3—Magnet out of time?
- 4—Secondary wiring leaks with compression, not shown in air?

Case No. 8—Motor Will Not Operate KNOWN QUANTITIES INVOLVING THE MAGNETO

- 1—Compression is normal
- 2—Carburetor in normal state
- 3—Timer in good order, battery side
- 4—Battery ignition wiring in good order
- 5—Battery in good order
- 6—Spark coil in good order
- 7—Magnet system will not work
- 8—No spark at the spark plugs

UNKNOWN QUANTITIES INVOLVING THE MAGNETO

- 1—Secondary wiring open circuit?
- 2—Secondary wiring short circuited?
- 3—Distributor contacts not bearing?
- 4—Short circuited distributor?
- 5—Primary contacts in distributor worn down and not making contact?
- 6—Wiring wrongly connected?
- 7—Magnet wiring—armature—short circuited?
- 8—Permanent magnets demagnetized?
- 9—Driving mechanism adrift?
- 10—Condenser defective?
- 11—Ground connection open circuited?
- 12—General leak due to oil and dirt?

Case No. 9—Motor Will Not Operate KNOWN QUANTITIES INVOLVING THE CRANKING

- 1—Compression is normal
- 2—Carburetor in normal state
- 3—Ignition systems in good order
- 4—Gasoline supply available
- 5—Motor "back kicks"

UNKNOWN QUANTITIES INVOLVING THE CRANKING

- 1—Hot motor?
- 2—Spark advanced?
- 3—Lost motion in spark control system?
- 4—Combustion chamber incrustation?
- 5—Detonating ingredients in gasoline?
- 6—High compression and slow cranking?
- 7—Timer adrift?
- 8—Broken tooth in half-time gear?
- 9—Camshaft out of true relation?

Case No. 10—Motor Runs Normally KNOWN QUANTITIES INVOLVING THE CLUTCH

- 1—The clutch holds
- 2—Impediment to speed changing lever

UNKNOWN QUANTITIES INVOLVING THE CLUTCH

- 1—Kink in the sliding gear shaft?
- 2—Bunged-up gear teeth?
- 3—Linkage adrift?
- 4—Sticky bearing?
- 5—Broken lever?
- 6—Broken or sprung gearcase?
- 7—Congealed oil in sliding mechanism?
- 8—Lost keys?
- 9—Driving mechanism adrift?

Case No. 11—Motors Run Normally KNOWN QUANTITIES INVOLVING THE GEARS

- 1—Change speed lever is free
- 2—Clutch movement is free
- 3—Clutch holds

UNKNOWN QUANTITIES INVOLVING THE GEARS

- 1—Key out of a gear?
- 2—Stripped gear?
- 3—Shaft spread?
- 4—Shaft twisted off? Planetary especially.
- 5—Gears slide by?
- 6—Broken linkage?

Case No. 12—Motors Run Normally KNOWN QUANTITIES INVOLVING THE CLUTCH

- 1—The change speed lever is free
- 2—Clutch movement is free
- 3—The clutch does not hold

UNKNOWN QUANTITIES INVOLVING THE CLUTCH

- 1—The leather facing is oily?
- 2—The leather facing is charred?
- 3—The leather is hard and does not press uniformly?
- 4—The clutch spring is weak?
- 5—The clutch is out of alignment?
- 6—The sliding bearings are dry?
- 7—The clutch is worn and will not advance to a bearing?
- 8—Clutch band broken?
- 9—Clutch lever bent?
- 10—Dog bent or worn?
- 11—Toggle with excessive lost motion?
- 12—Foot lever strikes deck?
- 13—Take-up all in?
- 14—Disk facings worn out?
- 15—Disks adrift from keys?
- 16—Cork inserts worn below surfaces?
- 17—Clutch cone worn?
- 18—Wedge cut away?
- 19—Screw worn?
- 20—Excessive oil?
- 21—Dirt impediment?
- 22—Take-up backs off?
- 23—Chassis lateral backs away from strain?
- 24—Spiral band too long?
- 25—Affected by centrifugal force?
- 26—Brakes either on or too tightly adjusted?

Case No. 13—Motor Runs Normally KNOWN QUANTITIES INVOLVING THE CLUTCH

- 1—The change speed lever is free
- 2—The clutch sticks

UNKNOWN QUANTITIES INVOLVING THE CLUTCH

- 1—"Frozen" shaft?
- 2—Lack of lubrication?
- 3—Congealed oil, cold weather?
- 4—Sag in chassis frame?
- 5—Shaft twisted?
- 6—Spring broken?
- 7—Disk deformed?
- 8—Broken motor or gearcase arm?
- 9—Deformed driving arm?
- 10—Thickened leather or other facings of disk clutches?
- 11—Damage due to thrust?
- 12—Bent crankshaft?
- 13—Bent planetary shaft?
- 14—Deformed linkages?
- 15—Stuck "dogs"?
- 16—Worn screws?
- 17—Tight spiral band?
- 18—Dent in housing?
- 19—Shifted motor?
- 20—Shifted transmission?
- 21—Dirt, foreign substances?
- 22—Bent pedal?
- 23—Insecure locking devices?
- 24—Centrifugal force?
- 25—Torn leather facing of cone clutch?
- 26—Worn faces changing the distance of travel?

Case No. 14—Motor Runs Noisy KNOWN QUANTITIES INVOLVING THE MOTOR

- 1—Compression moderate
- 2—Runs hot on retarded spark
- 3—Knocks badly on long grade

UNKNOWN QUANTITIES INVOLVING THE MOTOR

- 1—Carburetor delivers rich mixture
- 2—Excessive lubrication
- 3—Poor selection of lubricant
- 4—Cooling system inefficient
- 5—Carbon deposit in cylinders

Case No. 15—Motor Runs Noisy

UNKNOWN QUANTITIES INVOLVING THE MOTOR

- 1—Compression moderate
- 2—Lubrication good
- 3—Cooling system efficient
- 4—Carburetor working correctly
- 5—Timing correct
- 6—Knocks at the higher speed range

KNOWN QUANTITIES INVOLVING THE MOTOR

- 1—Pistons a loose fit?
- 2—Pistons worn?
- 3—Piston pin bearing slack?
- 4—Crank pin bearings slack?
- 5—Main bearings slack?
- 6—Crankshaft bent, imparting side shake to connecting rod?
- 7—Crankshaft end motion?
- 8—Valve clatter due to strong springs?
- 9—Valve clatter due to wear in guides?
- 10—Loose valve lifts or tappets?
- 11—Loose half-time gears?
- 12—Camshaft twisted?
- 13—Timing deranged?
- 14—Flywheel loose on crankshaft?
- 15—Clutch scraping?
- 16—Connecting rod striking crankcase?
- 17—Stray bolt or nut adrift in crankcase?
- 18—Wheezing of air or mixture through open seams?
- 19—Exhaust manifold open at joints or elsewhere?
- 20—Dry bearings due to lack of oil?
- 21—Cylinder loose?
- 22—Fan striking cooler, common?
- 23—Lost motion in timer?
- 24—Magnet armature striking?
- 25—Flywheel scraping on pan?
- 26—Water pump worn?

Case No. 16—Motor Runs Normally KNOWN QUANTITIES INVOLVING NOISE

- 1—Car standing, motor runs noiselessly
- 2—Car running, motor runs noiselessly
- 3—Car runs noiselessly, direct on the high
- 4—Excessive noise on low gears

Note.—In some cars the direct is on the third speed, in others on the fourth, and there are some designed to give direct drive on both third and fourth. It will be understood that "direct drive" as implied in such cases is a play on language. It is direct as regards the change-gears only. The drive through the bevel gears is not eliminated.

UNKNOWN QUANTITIES INVOLVING NOISE

- 1—Gears not set to the pitch line?
- 2—Gears not properly shaped?
- 3—Pitch line velocity of gears too high?
- 4—Gear teeth bunged up?
- 5—Gearshafts loose in bearings?
- 6—Oil leaked out, planetary?
- 7—Transmission case full of grit?
- 8—Shaft end motion, thrust bearing not adjusted?

Case No. 18—The Car Runs Normally KNOWN QUANTITIES INVOLVING MAINTENANCE

- 1—The motor is sweet running
- 2—The transmission is adequate and silent
- 3—The compensation, differential, serves the purpose
- 4—The live rear axle is silent and satisfactory
- 5—The sprockets are silent and satisfactory
- 6—The propeller shaft performs properly
- 7—The wheels are of adequate diameter and strength
- 8—The steering is irreversible and steady
- 9—The gear ratio is appropriate to the motor
- 10—The cooling system is efficient
- 11—The brakes are powerful and dependable
- 12—The lubrication is profuse and dependable
- 13—The ignition is adequate and free from petty annoyances
- 14—Protection from dust and the elements, complete
- 15—The tire equipment is good and satisfactory
- 16—The carburetor works under all conditions

- 17—The fuel supply is adequate
- 18—The spring suspension is flexible and satisfactory
- 19—The lighting equipment is efficient and dependable
- 20—The clutch is not "fierce"
- 21—The clutch will hold
- 22—The bearings are of adequate dimensions for the work
- 23—The chassis frame is rigid and strong
- 24—The universal joints are strong and free from lost motion
- 25—The battery equipment is of ample capacity
- 26—The tool kit is complete and appropriate

UNKNOWN QUANTITIES INVOLVING MAINTENANCE

- 1—The oil will become acid and etch the polished surfaces?
- 2—The "decarbonizer" will attack the cylinder surfaces?
- 3—The "dope" in the fuel will etch the cylinder surfaces?
- 4—The "inflating gas" will deteriorate the tires?
- 5—Open wounds in the tires will let dampness into the fabric and enable mildew to attack the same?
- 6—The leather facings will be burnt if the clutch is permitted to slip?
- 7—The fiber facings on the brakes will burn out if the brakes are kept "on" while the car is in motion?
- 8—The sprocket chains will wear out if they are not kept clean and lubricated?
- 9—The transmission will be noisy if "grease" is not used?
- 10—The grease in the transmission will do damage if it is not changed regularly?
- 11—The lubricating oil loses its lubricating properties?
- 12—The "clash gears" will be banged up if the shifting is carelessly performed?
- 13—The springs will deteriorate if they are not kept oiled?
- 14—The crankshaft will deteriorate the more quickly if the motor is "raced"?
- 15—Excess lubrication will end in carbon deposits?
- 16—Excess gasoline defeats power and increases cost?
- 17—A steady gait ends in the greatest average speed?
- 18—The car deterioration increases enormously with speeding for short distances, only to violently apply the brakes, thus alternating between fast and slow?
- 19—Parts subjected to "shock" will deteriorate in that the metal is rendered crystalline; the more quickly if the car is abused?
- 20—Mud left on the body over night takes varnish off with it the next morning?
- 21—Negotiating curves at high speed does much damage?
- 22—A maker's guarantee is of no value to a reckless owner?
- 23—"When the cat is away the mouse will play." The chauffeur does not own the car?
- 24—Wet rubber cuts easily. Be careful on sloppy roads?
- 25—Noise in a car is like pain in a man. It indicates some derangement to be looked after before it is too late?
- 26—In relation to 1, 2, 3 and 4, it is to say, if the several products referred to are not appropriate, the owner of a car must assure himself of the characteristics of such products before he takes a chance, for, when the damage is done, he will have to pay the score?

Case No. 17—Motor Runs Normally

- KNOWN QUANTITIES INVOLVING NOISE
- 1—Car standing still, motor runs noiselessly
 - 2—Car in motion, motor runs noiselessly
 - 3—Car makes noise on all gears
- UNKNOWN QUANTITIES INVOLVING NOISE
- 1—All possibilities of case seventeen?
 - 2—Bevel gears not adjusted?
 - 3—Bevel gears not properly shaped?
 - 4—Bevel gears not lubricated?
 - 5—Compensating gears deranged?
 - 6—Lost motion in live axle?
 - 7—Universal joints worn?
 - 8—Wheel bearings loose?
 - 9—Sprockets worn?
 - 10—Stack sprocket chains?
 - 11—Lost motion in radius rods?
 - 12—Lost motion in distance rods?
 - 13—Propeller shaft twisted?
 - 14—Jacksaft twisted?
 - 15—Loose spring shackles?
 - 16—Steering linkages loose?
 - 17—Steering knuckle, lost motion?
 - 18—Lost motion in steering gear?
 - 19—Flapping mudguard?
 - 20—Loose hood?
 - 21—Loose Apron?
 - 22—Squeaks for oil in small bearings?
 - 23—Body loose on chassis frame?
 - 24—Click of roller bearing washers?
 - 25—Spring clamps loose?
 - 26—Shock absorbers loose?

LONG STROKE ADVANTAGEOUS

The long stroke motor is distinctly advantageous, concludes Gerald Laverne, after a close study in *Omnia* of the results obtained by all the most important European constructors. Its disadvantages, which may be summed up as increased area of the motor, increase in weight, increased losses in cooling—which can be diminished by the increase of the linear speed of the piston—are not to be compared with such advantages as the more homogenous formation of the charge, the more complete accomplishment of the various cycles, and especially the better utilization of the explosive stroke, decreased wear, higher compression and the advantages which arise from it. Experience has abundantly proved the advantage of a long stroke. The question is what figures to adopt. Though it would be presumptuous at the present time to definitely fix the ratio of bore to stroke, certain modifications can, however, be made with advantage to the figures generally adopted. The ratio of maximum pressure developed by the explosion to the average pressure is usually 15; there would be an advantage in diminishing this by reducing the piston surface and increasing the stroke. The proportions of the explosive charge are generally 13.5 parts of air to one part of gasoline; the proportion might be increased to fifteen parts of air. Thus, without fear of pre-ignition the compression could be increased to 6 kilogrammes per square centimeter—85.3 pounds per square inch—or to 5 kilogrammes—71 pounds—for touring cars in order to facilitate speeding up of the engine. The linear speed of the piston, which, as shown by the table of leading French motors, model 1906, oscillated between 141 inches and 314 inches, has increased to 472 inches per second in the single cylinder Delage. The speed could generally be carried to 310 to 390 inches a second. The following table shows the tendency of

French and foreign constructors in the matter of ratio of stroke to bores:

	1	2	3
Number of builders.....	77	32	18
Number of motors.....	77	126	57
Percentage of short motors..	10	55.5	7
Percentage of square motors..	6	10.3	3.5
Percentage of long motors..	84	84.2	89.5
Maximum ratio of stroke to bore	1.50	1.60	1.40
Percentage of ratios for long motors—Above 1.30.....	16	21.4	6
From 1.30 to 1.21.....	9	17.4	26
From 1.20 to 1.11.....	28	50.9	40
From 1.10 to 1.01.....	30	10.3	28

- 1—French cars, 1906, up to 6.2 in. bore.
- 2—French cars, 1908.
- 3—French cars, 1908.

ENGINEERS TO MEET

Cleveland, O., Sept. 14—The Society of Automobile Engineers is to meet at Cleveland Thursday next for its third quarterly meeting of the present year. The morning of the first day, Friday, will be devoted to visiting a number of the motor car manufacturing plants which give Cleveland its important position in the industry, among them being the Stearns, White, Winton and Peerless, as well as some of the parts-making plants, such as that of the Hydraulic Pressed Steel Co. The business meeting will be opened at the Hollenden after lunch and will be followed by the technical sessions, the latter also being continued after dinner in the evening. Saturday morning a special train will be boarded at the Union depot for the trip to Akron, where the morning will be spent in making visits of inspection to the plants of the Goodrich and Diamond companies. Following this, the engineers will go to Canton, where they will inspect the plant of the Timken Roller-Bearing Axle Co., as guests of the latter. The papers scheduled for the meeting are: "The Limitations of the Universal Joint," by M. Vanderbeek; "What Carbon Does to Motor Car Steel," by Thomas J. Fay, president of the society, and "What Is the Best Timing?" by Louis Lacoïn, a translation from the French *Omnia*, by Charles B. Hayward.

NEW FIAT BOARD

Paris, Sept. 8—Recently an extra or special meeting of stockholders of the Fiat company was held in Turin. As a result of the troubles that have been reported, all the members of the administration department tendered their resignation. After passing a resolution thanking the administrators, most of whom had been with the company since its organization, the resignations were accepted and immediately a new board of administrators elected.



The Readers' Clearing House



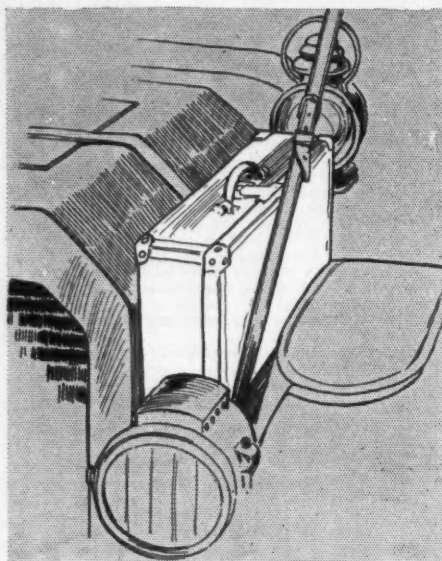
IMPROVISED LUGGAGE CARRIERS

Chicago—Editor Motor Age—What to do with one's luggage while touring is a proposition that assumes formidable proportions when one's car is not equipped with trunk racks at the rear. Especially is this so when the car is of small size and with not overly much room in the tonneau. If one attempts to pack a couple of suit cases in the tonneau and carry two or three persons also the passengers find themselves cramped for room and in consequence the pleasure of the journey is marred to a certain extent. Recently I made a trip from Galesburg, Ill., to Chicago in a two-cylinder Reo touring car. I had two passengers and there were two suit cases and an extra tire casing, not to mention the wraps of the women passengers. With such a load in the tonneau it was decidedly uncomfortable until a bystander suggested putting the suit cases alongside the bonnet. An investigation showed that it was an ideal place, it being possible to fit a suit case in between the gas lamp in front and the oil lamp on the dash. The bottom of the suit case rested on the curve of the hood, while the wind shield brace on the outside held it securely on one side, while the bonnet itself formed the other side of the pocket. In addition the strap running from the frame to support the top made an additional brace. So snugly did the two suit cases fit that there was no necessity to strap them and not once in the 200-mile trip did either give any trouble, while it was possible at any time to lift one out to get at the contents without having to unstrap anything. I enclose a sketch showing how the improvised luggage carrier works. I have investigated other cars and think the scheme can be used on others than Reos.—C. G. Slater.

RECHARGING STORAGE CELLS

Clifton, Kan.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, advise me on the following? I understand that if a storage battery for an electric vehicle is charged for 60 miles and it is recharged after running only 30 miles, 40 miles of the life of the battery is lost; the better plan being to let the battery run down to the danger point before recharging. Is that correct? If so, does the same rule apply to the small storage batteries for ignition purposes, or will the life of the battery be the same, whether kept constantly charged by a battery charger, such as the Fisher or Apple chargers, or allowed to run down to the minimum and then recharged? In the Readers' Clearing House, September 3, in answer to C. S. F. on "Three Oil Queries," Motor Age stated that moist air will cause

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems and invites a discussion of pertinent subjects. Correspondence is solicited from subscribers and others.



CARRYING SUITCASE ON REO

a better explosion than dry air on account of its containing more oxygen. If that is the case, would not a sponge in some receptacle filled with water, in close proximity to the carburetor have the same effect, thus constantly giving the engine the snappy evening atmosphere?—L. Pfister.

You are quite right in saying that if a battery charged to run 60 is only run 30 before being recharged, then 30 miles of the life of that battery is lost, but not 40 miles, as you state. Battery experts agree that a battery for an electric vehicle will stand 200 chargings through the gassing period. By the gassing period is meant the giving off, by a battery, of gas when its recharging is nearly completed. This formation of gas is due to the following condition: In recharging a battery, so much current per square unit of plate area is given, and as some of the cells charge quicker than others a period is reached in which this amount of current started with is not required for charging purposes, and it goes to breaking up the water of the battery into oxygen and hydrogen gases in accordance with the theory of electrolysis. It is this formation of oxygen and hydrogen gas which is known as the gassing period. To show the loss to the battery life of recharging before a complete discharge, the following figures apply: A battery with a 50-mile radius and capable of 200 recharges to the gassing period has a life of 50 miles multiplied by 200, giving 10,000 miles. If this

battery were recharged after only 25 miles of running, all through its life, it would only have a life mileage of 25 miles multiplied by 200, or 5,000 miles. This is because the battery will only endure 200 charges through the gassing period. Consequently, in your case, with a battery of a radius of 60 miles which is recharged after 30 miles, the loss is 30 miles and in the life of the battery this would amount to 6,000 miles, or half its radius of life operation. The proper course to pursue in a case of this kind, where the battery has a mileage of 60 and only 30 of which are used, is to use the remaining recharge to the minimum and then immediately, or soon after, recharge. It is extremely dangerous to leave a discharged battery for any length of time because a sulphating forms on the negative plates, which is of a peculiarly high resistance, so that when the battery is recharged it takes a longer time to reduce the sulphating, and during which time there is danger of disintegrating the filling on the positive plates, due to prolonged charring through the gassing period. The minimum status of a battery before recharge should be approximately 1.8-10 volts per cell, which would be 72 volts for a forty-cell battery. It frequently happens, however, that all of the forty cells have not this uniform 1.8-10 voltage; while some have more, others have less. On page 13, September, 1907, issue of Exide Instruction Book, published by the Electric Storage Battery Co., Philadelphia, full instructions on this subject are given. The same condition applies to small storage batteries for ignition purposes, but the conditions are somewhat accentuated in this case, in that these batteries are invariably run until they are down and out, at which time there must be considerable sulphating on the negative plates. In the recharge this has to be overcome, and at the expense of the positive. Motor Age sees no reason why a sponge, or some other receptacle filled with water, would not have the desired effect, but the great trouble would be the maintaining of a proper degree of moisture, as well as furnishing a supply for this purpose.

IOWA SPEED LAWS

George, Ia.—Editor Motor Age—The state of Iowa has a law, regulating the speed of motor cars, limiting the same to 10 miles an hour in the business part of town, 15 miles in the residence part, and 20 miles in the country. Through the Readers' Clearing House, will Motor Age inform me if a town or city council has any authority to pass an ordinance which further limits this speed, bringing the same down to say 8 and 12 miles?—Subscriber.

Motor Age has a complete copy of the Iowa law, which shows the speeds to be 10, 15 and 20 miles per hour, as you state. It would appear from this law that municipalities have no right to enforce speed regulations other than those provided. In the state laws of Illinois and some other states, it is provided that park commissioners, having control over parks and boulevard systems, have permission to adopt special speed regulations which may be lower than those speeds stipulated in the state ordinance. Motor Age understands that an Iowa city council can regulate specially the speed of sight-seeing and other hired motor vehicles.

BEAVER ENGINE WAS USED

Charleston, S. C.—Editor Motor Age—Will Motor Age give me the name of the maker of the motor used by the Detroit Auto Vehicle Co. in their 1907 cars?

The motor used in the Detroit Auto Vehicle Co.'s 1907 cars was manufactured by the Beaver Mfg. Co., Chase and Burrell streets, Milwaukee, Wis.

MAKE KELLY-SPRINGFIELD TIRES

Swift Falls, Minn.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, inform me where the Kelly-Springfield solid rubber tires are manufactured?

The Kelly-Springfield tires are manufactured by the Kelly-Springfield Co., Springfield, O.

POPE-HARTFORD EQUIPMENT

Little Falls, Minn.—Editor Motor Age—Will Motor Age please state the price on Pope-Hartford 1908 M touring car with top. Also state what extras go with car.—T. W. Berg.

This car lists at \$2,750 without top, which is \$150 extra. The regular equipment includes headlights, generator, horn and general tools.

ANOTHER IDEAL CAR

Redstone, N. H.—Editor Motor Age—Unless Motor Age has "closed the books" on "Ideal cars," I should like to submit one, which is essentially a touring car. The specifications are:

Body—Straight line, five passengers, touring, metal.

Wheelbase—124 inches.

Tires—Front and rear, 36 by 4½; demountable rims.

Axles—I beam front and rear.

Drive—Double side chains with mud-proof, dust-proof, and oil-tight metal chain case, something similar to that on the Chadwick Great Six.

Springs—Front, semi-elliptic, with side rail attachment for rear ends as on 1908 50-horsepower American Tourist; rear, platform.

Steering—Thread and nut, 17-inch wheel.

Cooling—Water, flat tube radiator, modified square in shape, American Tourist, to allow of greatest capacity within given limits.

Brakes—Three sets; regular hand and foot brakes, both being internal expanding, side by side in wide drums on rear wheels, as on the American roadster, and an extra foot brake on the jackshaft, not to be used regularly, in order to save the chains.

Motor—Four-cycle with four offset cylinders cast in pairs. Valves large, though all on same side. Bore, 5¼; stroke, 5½—American roadster.

Ignition—Double jump-spark with high-tension magneto and battery systems.

Lubrication—Splash, force feed. Pipes to cylinder walls and two to crankcase, divided into two separate compartments, as on the Peerless.

Clutch—Disk, Stevens-Duryea type.

Flexible Joints—Two between clutch and transmission, similar to arrangement on Peerless.

Transmission—Four-speed selective, with direct drive on both third and fourth speeds as on 1908 40-45-horsepower Isotta Fraschini.

Bearings—All ball, except engine, which should be plain.

The ideal touring car should be chain-driven; because when chains are encased as specified, none of the objections usually urged against this type apply, and because this construction is lighter and gives a better weight distribution, meaning less wear on tires, especially rear ones, and a car that rides better and behaves better generally on anything but perfect roads. Furthermore, this construction admits of the type of transmission specified, highly desirable for a touring car, to be used in mountainous as well as level country, and permits of the unit construction of the transmission and driving gears, the advantages of which have been so extolled lately without resorting to the expedient, monstrous on a high-powered touring car, of mounting the transmission on the rear axle, as on some shaft-driven cars today. Touring by Americans of America, where we cannot hope to have consistently good roads for many, many years, is just beginning to be popular. American manufacturers are, therefore, making a mistake in accepting as final the present popularity

of the shaft-driven type, acquired by the use of cars for by far the most part, for pleasure driving in and around cities and suburbs. Instead they should exercise a little ingenuity to develop a satisfactory chain case, thereby perfecting the superior type of vehicle for touring, if, in fact, not all purposes, and one for which there will be a great demand when its advantages are more universally understood and after automobilists generally have had more experience with our country roads.—Demarest Lloyd.

BOOK ON MAGNETOS

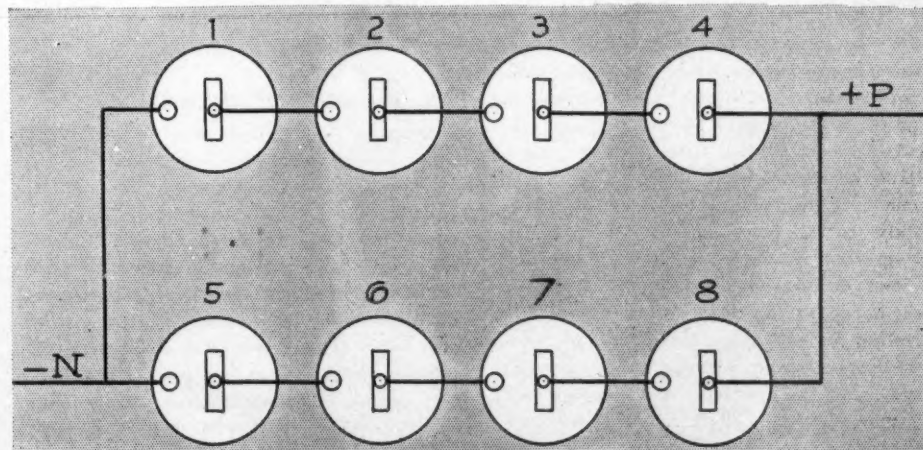
Hillsboro, N. D.—Editor Motor Age—Will Motor Age inform me where I can obtain a book on the construction, operation and repair of magnetos?—J. A. S.

A good book on the market relating to this subject is entitled "Motor Ignition Appliances," by T. H. Hawley, published by the Cycle Trade Publishing Co., Ltd., 19 and 21 Wilson street, London E. C., England.

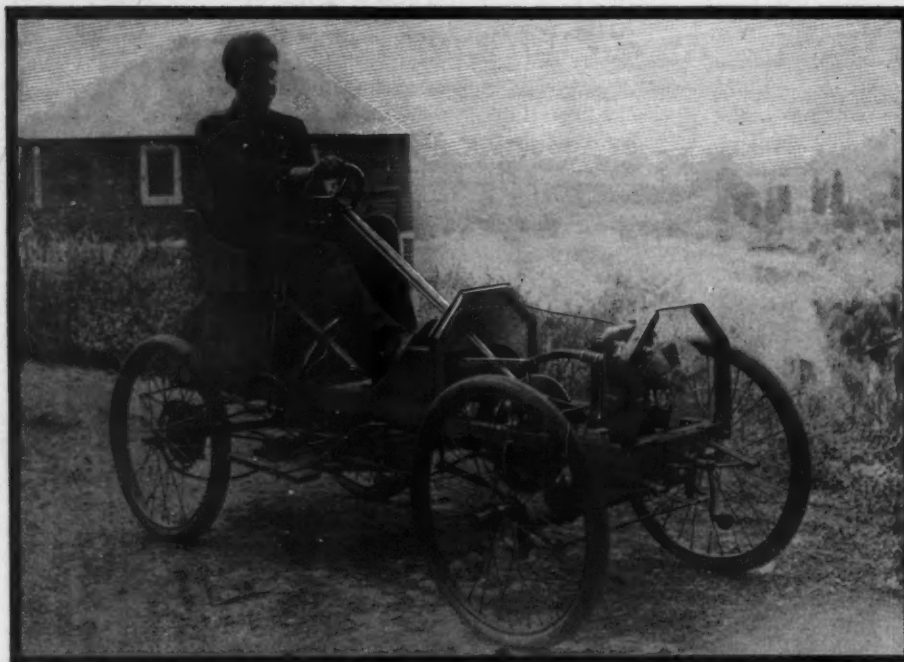
SERIES-MULTIPLE CONNECTIONS

Columbia, Tenn.—Editor Motor Age—In using eight dry cells, is it preferable to connect them in series-parallel or in sets of four each connected in series-multiple? The double-opposed motor in my car, when the crankcase is filled with oil, produces a smoky exhaust. If I attach baffle plates to the open ends of the cylinders, could this same oil level be maintained without the oil reaching the combustion to such an extent? What is the best method of attaching the baffle plate?—H. Anderson.

In using eight dry cells, the series-multiple is preferable, in which the eight cells are in two groups connected in series, the cells 1, 2, 3 and 4, constituting group 1, and 5, 6, 7 and 8, group 2. The respective positives are connected, forming a main positive P and the two negatives, similarly united, forming a main negative N. A wiring system of this nature produces but the voltage of four cells, and the amperage of two. Oil baffle plates are used solely on vertical engines, these plates taking the form of circular disks, equal in diameter to the cylinder bore, fitted between the top of the crankcase



THE SERIES—MULTIPLE SYSTEM OF WIRING DRY CELLS



COWAN'S "CALIFORNIA MIDGET"—A BOY-MADE CAR

and the open end of the cylinder. In each baffle plate is a longitudinal slot through which the connecting rod operates. A system of this nature could not be successfully used in a horizontal motor, because when the oil reached a certain level it would flow through the slot in which the connecting rod operates. Undoubtedly, the noise of your motor can be eliminated without such extravagant use of oil. The most likely fault is a loose connecting rod bearing at the crankshaft end, which can be verified by access to the inside of the case.

IOWA STATE MOTOR LAW

Farragut, Ia.—Editor Motor Age—Will Motor Age inform me where I can secure a book containing the motor laws of Iowa, or the right of way in Iowa? When a motorist drives up behind a team and toots his horn and the team keeps the road, is the motorist responsible for accidents if the man with the team waves his hand as a signal to stop and the motorist drives on, frightening the team? How is the A. L. A. M. rating of a motor car figured?—Robert F. Johnston.

The Iowa law regarding meeting and passing horse vehicles is as follows: "Any person operating a motor vehicle shall, at request or on signal by putting up the hand, from a person riding or driving a restive horse or other draft or domestic animals, bring such motor vehicles immediately to a stop, and, if traveling in the opposite direction, remain stationary so long as may be reasonable to allow such horse or animals to pass, and, if traveling in the same direction, use reasonable caution in passing such horse or animal, and the operator and occupants of any motor vehicle shall render necessary assistance to the party having in charge said horse or other draft animal in so

passing." The formula used by the Association of Licensed Automobile Manufacturers in determining horsepower is

$$H = \frac{D^2 \times N}{2.5}$$

in which H equals horsepower, D cylinder diameter in inches, N the number of cylinders and 2.5 a constant.

FOUR-CYLINDER MOTOR BUSES

Centerville, Ia.—Editor Motor Age—I am in the market for a sixteen-passenger brake or stage for cross-country passenger traffic, my preference being for a three or four-cylinder car, two-cycle engine, selective transmission, magneto ignition and all of the other up-to-date appliances. Will Motor Age give me the names and addresses of manufacturers who make this type of car?—Carl Polson.

The four-cylinder vehicles of the type required are manufactured by Mack Brothers' Motor Car Co., Allentown, Pa.; Knox Automobile Co., Springfield, Mass.; Auto-Car Equipment Co., Buffalo, N. Y. Undoubtedly, special cars can be obtained, on request, from other manufacturers and commercial makers. All of the makers enumerated use the four-cylinder motor, selective gearset.

THE DECATUR-DENVER ROUTE

Decatur, Ill.—Editor Motor Age—Will Motor Age give me the best touring route from Decatur, Ill., to Denver, Colo.—A. H. Eyman.

In going from Decatur, Ill., to Denver, Colo., Motor Age is not prepared to give the best route, but mentions the following, which has been made by not a few cars. This route runs from Chicago west. Chicago to Omaha by way of Dixon, Ill., and Clinton, Cedar Rapids, Ames and Loveland, Iowa, to Omaha; across Nebraska by way of Grand Island, Lexington, North Platte, Buell to Julesburg; thence

through Colorado by way of Sterling, Merino, Snyder, Roggen, Hudson and Barr to Denver. Motor Age sees no reason why your route could not lie from Decatur to Springfield, thence through Missouri to Kansas City and from here joining the route mentioned at Omaha. The best route this way might be obtained by writing to W. W. Cowen, president of the Kansas City Automobile Club. Information on this route from readers of Motor Age addressed to Motor Age, 1200 Michigan avenue, Chicago, will be appreciated and forwarded to Mr. Eyman.

WANTS BIG TIRE CHAINS

Lancaster, Wis.—Editor Motor Age—Will Motor Age kindly inform me through the Readers' Clearing House where one can procure some sort of device similar to Victor anti-skids or Weed chains for a high-wheeled machine having 38-inch wheels and 1½-inch solid rubber tires?—H. E. Schreimer.

Motor Age is not aware of any concern manufacturing a device of this nature for motor buggies. Non-skids of this sort are manufactured for solid rubber tires 36 inches in diameter. No doubt anti-skids of the size desired could be obtained by communicating with the different makers.

BOY IN TEENS BUILDS CAR

Brice Cowan, a 15-year-old boy of Los Angeles, Cal., has just completed, after about 18 months of spare-time labor, a full-fledged motor car that for speed, hill-climbing and all other ordinary purposes is truly a marvel. It, which he calls the "California Midget," is about 6 feet in length, weighs 300 pounds, and at first glance reminds one of a boy's common pushcart. Despite its miniature proportions and cigar-box-like superstructure, it is strongly built, has a 3-horsepower Aster engine, and is capable of a speed, demonstrated by actual tests, of from 25 to 30 miles per hour. It has also climbed hills of 30 per cent grade, and carried three passengers over ordinary roads.

The "Midget" in working principle resembles the ordinary car. It has a friction transmission and a double chain drive. It possesses a 3-foot tread and is air-cooled. The battery control is through an electric-light switch and the differential operates perfectly. There are external brakes on the rear wheels. The machine is provided with nine speeds forward and three on the reverse. The car, aside from the engine, was built entirely by the boy, and even the engine had to be rebuilt to conform with the machine's peculiar makeup. The wheels also represent his workmanship, equipped with motor cycle tires. The machine carries 2 gallons of gasoline and will run 24 miles on each gallon. Master Cowan, the builder, works as a delivery boy for one of the city's dry goods stores, and up until he began working on the "Midget" knew nothing of mechanics except a meager knowledge acquired by reading. He wanted a car and he proceeded to build it.

Failures galore, due to a lack of mechanical knowledge, crowned his first efforts, but after 18 months of spare-time labor and two failures he has succeeded. He has spent in the meantime about \$150 for materials. He has an ambition now to build a larger and still better car.—Charles Alma Byers.

HANDLE CALCIUM CARBIDE

Lanark, Ill.—Editor Motor Age—Will Motor Age give me the addresses of concerns which market calcium carbide, inch carbide, also brass polish.—Guy Wolf.

Calcium carbide is manufactured by the following concerns: Acetylene Gas Illuminating Co., New York, N. Y.; Acetylene Co., Niagara Falls, N. Y.; American Carbolite Co., Duluth, Minn.; Union Carbide Co., Chicago, Ill. The Union Carbide Co., Chicago, sells half-inch carbide in 48-pound cases at \$3.60 a case, and 1-inch carbide in 60-pound cases at \$3.90 a case. The 3½-inch carbide sells at \$3.75 per 100 pounds. Metal polishes can be obtained from Adams & Elting Co., Chicago, Ill.; American Metal Polish Co., West Summerville, Mass., and many other metal polish manufacturers.

USE OF THE CAMSHAFT

North Milwaukee, Wis.—Editor Motor Age—Will Motor Age describe the function of a camshaft in a four-cylinder motor, its object, and, if possible, make a diagram?—B. Penner.

In a gasoline motor the camshaft is to open the intake and exhaust valves, to allow the explosive mixture to enter and allow the exhaust gases to escape. In many motors one camshaft opens the intake and exhaust valves, whereas in others there is one camshaft to open the intake valves and another to open the exhaust valves. Besides opening the valves the cams on the camshaft determine how long the valve remains open and the speed with which it opens and closes. The accompanying illustration shows how this is accomplished, it representing a single-cylinder motor as seen with the cylinder cut vertically in two. In this illustration A is the crankshaft, which is revolved by the explosions in the cylinder, forcing the piston P downward. The camshaft is marked D and carries a cam or raised bump E upon it, the cam being pinned in place. The camshaft is driven at half the speed of the crankshaft through the spur gears B and C, the gear B being one-half the size of C, consequently driving C at but half of its speed. The valve to be opened is H, which in opening has to be lifted off its seating. This is done when the cam E revolves and raises against the roller G, which is on the bottom of the lifter rod F. The rod F extends upward and rests against the bottom of the stem of the valve H, although between the two or at their point of contact are nut and locknut L for lengthening or shortening the lifter F, and so to vary the time of opening or closing of the valve. The spring K is compressed or squeezed together when the valve is opened and im-

mediately the cam E travels around and allows the roller G to fall; this spring exerts its pressure and closes the valve. Directly above valve H is the intake valve M, which in this case opens by moving downward. This valve is automatically opened, not requiring aid from a camshaft. It is opened by the suction of the engine, the same as the valves in the common water pump. The majority of the camshafts are made with the cams E separate from the shaft, but of late not a few of the best make of cars employ camshafts in which the cams are solid with the shaft. This is a more expensive construction, but there is not any danger of the cams getting out of position.

VOLTS IN HIGH-TENSION WIRES

Chicago, Ill.—Editor Motor Age—How many volts are there in the wires from the coil to the spark plugs? I have a Splitdorf coil and use a 6-ampere, 60-volt storage battery.—Reader.

The voltage in the high-tension wires from the coil to the spark plug often ranges from 25,000 to 40,000. This is the high-tension current. With magneto ignition it frequently runs as high as 55,000 volts.

EXHIBITED FRICTION-DRIVE TRUCK

Akron, O.—Editor Motor Age—Can Motor Age give me the name of the parties who exhibited a motor truck at the last show in Chicago? It used friction drive, side chains, one friction for each wheel, no differential. I think it was shown in Tattersall's.—G. G. Crowley.

From the information given it is, impossible for Motor Age to state definitely which truck you refer to. This descrip-

tion suits the truck manufactured by the Commercial Motor Truck Co., Plymouth, O., and also a light delivery wagon built by the Weeks Motor Vehicle Co., Chicago, Ill. If you will give more definite information on the matter Motor Age will undoubtedly discover which is the truck desired.

MANUFACTURE TIMERS

Chicago, Ill.—Editor Motor Age—Will Motor Age inform me where I can obtain a list of the different makes of timers used on motor cars and what make is considered the best for four and six-cylinder engines?—J. C. Crowley.

Ignition timers are manufactured by over fifty makers, a few of them being Altemus & Co., Philadelphia, Pa.; Beckley-Ralston Co., Chicago, Ill.; Connecticut Telephone and Electric Co., Meriden, Conn.; Crouse-Hinds Co., Syracuse, N. Y.; Dayton Electrical Mfg. Co., Dayton, O.; Dowe Portable Electric Co., Braintree, Mass.; Heinze Electric Co., Lowell, Mass.; Herz & Co., New York, N. Y.; Atwater-Kent Mfg. works, Philadelphia, Pa.; Lovell-McConnell Mfg. Co., Newark, N. J.; Pittsfield Spark Coil Co., Dalton, Mass.; Powell Muffler & Timer Co., Utica, N. Y.; Robert Instrument Co., Detroit, Mich.; Schug Electric Mfg. Co., Detroit, Mich.; Witherbee Igniter Co., New York, N. Y.; Uncas Specialty Co., Norwich, Conn.; Pioneer Brass Works, Indianapolis, Ind.; Mosler & Co., New York, N. Y., and many others.

THEY MAKE TURNTABLES

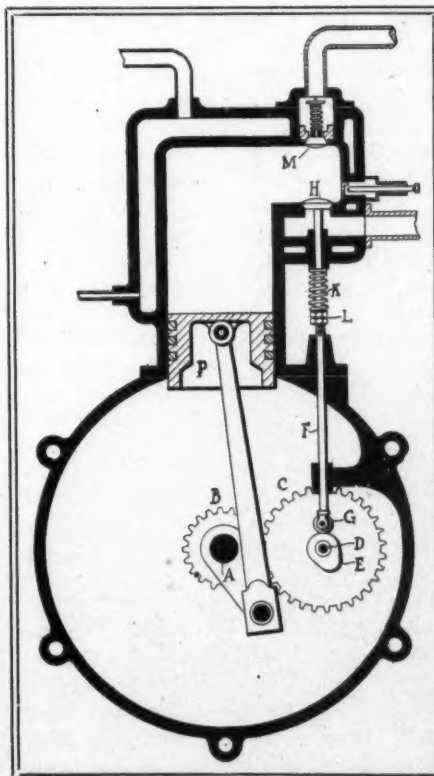
Rochester, N. Y.—Editor Motor Age—Will Motor Age advise me who are manufacturers of light turn-tables suitable for a private garage?—J. Lawrence Hill.

Turn-tables of different sizes are manufactured by the following concerns, but Motor Age cannot state definitely which is most suitable for your garage: Bicycle Step Ladder Co., 63 Randolph street, Chicago, Ill.; Canton Foundry & Machine Co., Canton, O.; S. Elliott, Newton, Mass.; C. F. Ernst's Sons, Buffalo, N. Y.; Fellwock Automobile & Mfg. Co., Evansville, Ind.; Link Belt Co., Philadelphia, Pa.; Lyon Utility Co., Rochester, N. Y.; North Pennsylvania Iron Co., Philadelphia, Pa.; Pitless Turntable Co., Kansas City, Mo.; Portland Garage Co., Portland, Me.; Skinner & Skinner, Chicago, Ill.; H. Smith Machine Co., Paterson, N. J., and Weber Cycle & Supply Co., Colorado Springs, Col.

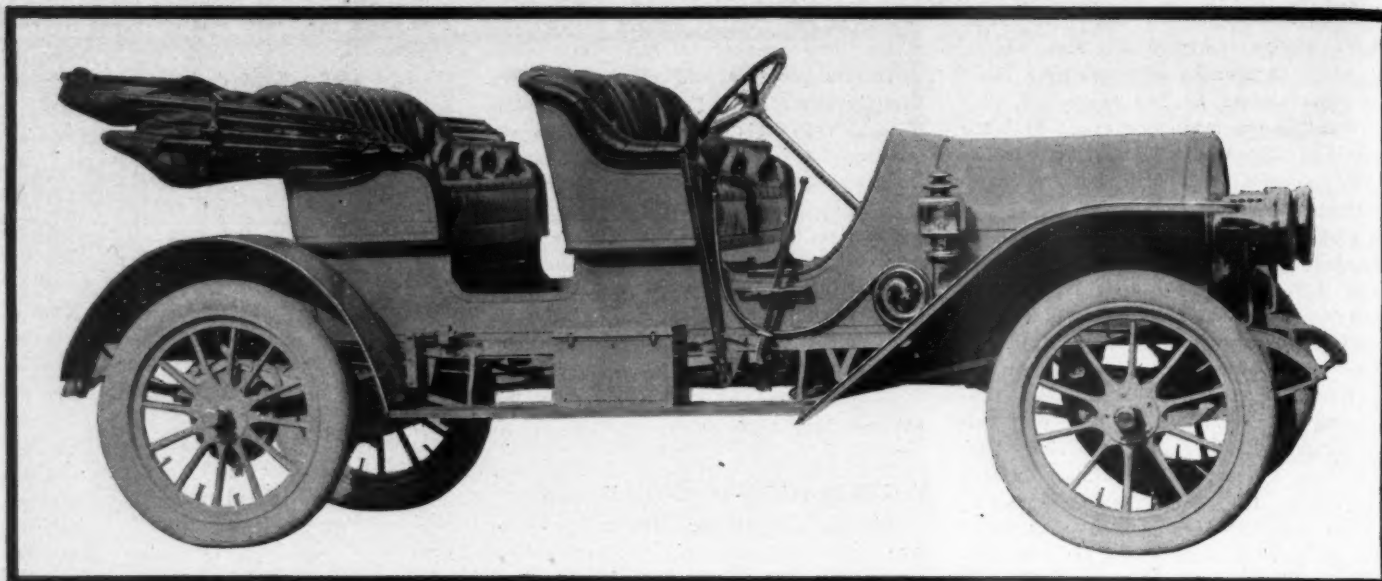
VANDERBILT CUP COURSE

Gladstone, N. J.—Editor Motor Age—Will Motor Age inform us the date of the Vanderbilt cup race? Also, if Motor Age has a sketch of the course, we would like very much to have a copy.—Ellis Tiger Co.

The Vanderbilt cup race will take place on the motor parkway on Long Island, New York, during the morning and forenoon of October 24. A description and map of this course appeared on pages 10 and 11 of Motor Age, August 13.



A CAMSHAFT AND ITS LOCATION



ADAMS CAR WITH REVOLVING STAR MOTOR

NO other company engaged in the manufacture of motor cars since the inception of the industry has pursued with such consistency the production of a machine designed along entirely unconventional lines than has the Adams Co., of Dubuque, Ia., builder of the Adams car with its revolving motor. The general details of this car are to many Motor Age readers an oft-told tale, but to the masses interested in motor cars for the first time during the 1908 season and the approaching 1909 period, a few words of explanation will be in order. This car has not undergone any important changes since the 1908 pattern was evolved, other than the employment of a three-speed selective gearset in place of the four-speed set, and the simplification in parts of the electric system. It will be manufactured in five-passenger touring car and roadster lines, neither of which betrays the fact that it employs a five-star revolving motor over the back axle, and has not a bit of machinery except the control and steering part ahead of this.

The Adams motor, rated at 50 horsepower, has a five-cylinder motor with bore and stroke of $5\frac{1}{2}$ and 5 inches. In this

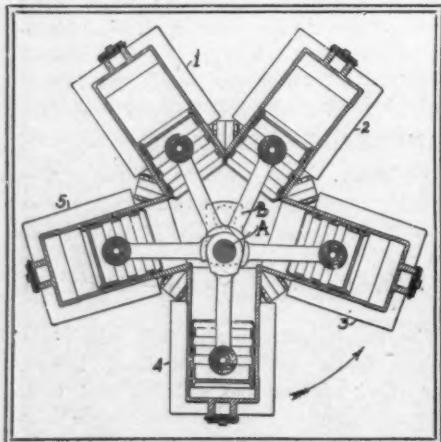


FIG. 1—DIAGRAM OF MOTOR

motor the crankshaft is mounted vertically and has but one throw, the same as ordinarily used for a single-cylinder engine. This crankshaft is stationary—it never revolves, but the five cylinders revolve around it, as does the front wheel of a motor car on the steering spindle. The car is without a radiator, being an air-cooled machine; as the motor cylinders revolve, a cooling fan is not needed. It is without a muffler, each cylinder exhausting directly into a box which incloses the motor. The motor is directly above the transmission set, and as the motor is without a flywheel of any sort, it has been necessary for the designer to carry the double-cone clutch within the selective gearset. The paradoxes of this car can be carried further. The drive from the revolving cylinders to the gearset is through a bevel gear attached to the base of the revolving crankcase and which meshes with a bevel on one of the transverse shafts of the transmission. From the transmission to the rear axle, chain drive is employed. The car is without a float-feed carbureter, but instead uses a pump to maintain a gasoline level in a chamber in which a spraying nozzle and an air valve complete the carbureter. Instead of controlling the motor speed by advancing or retarding the spark and opening and closing the throttle, it is all done by controlling the length of time each intake valve is held open. This motor has but one cam to open all of the ten valves. This cam being in two parts, it is possible to shift one, thereby varying the length of opening given a valve and allowing a part of the mixture drawn into a cylinder to escape on the compression stroke so the explosive pressure can be varied from 90 pounds to 0 and the power of the motor and its speed correspondingly varied. There is not any branching manifold to convey the mixture to the cylinders; the exhaust manifold is entirely

lacking; the electric system is very simple, as is the oiling system. In fact, on this car the only parts that are conventional are the brakes and the steering gear. Everything else is Adams and Dubuque, and the amount of energy that the company must expend annually in marketing an opposition car of this nature, as well as the gray matter required in perfecting all of the schemes without assistance from any of the other 200 motor car manufacturers, can serve as a criterion of an estimate of the energy needed in producing and marketing such a machine.

In Fig. 1 is a general diagram of the motor with its five cylinders designated respectively 1, 2, 3, 4 and 5, with five pistons shown in relative position. The crankshaft A has its one offset B. As each cylinder makes, in unison with the other four, two complete revolutions, it passes through the four cycles of operation common to any four-cycle engine—inspiring, compressing, exploding and exhausting. No. 4 cylinder is shown at the end of the out stroke, and the other four at different parts of the stroke; and as each in succession occupies the position of No. 4, its piston will be at the end of the

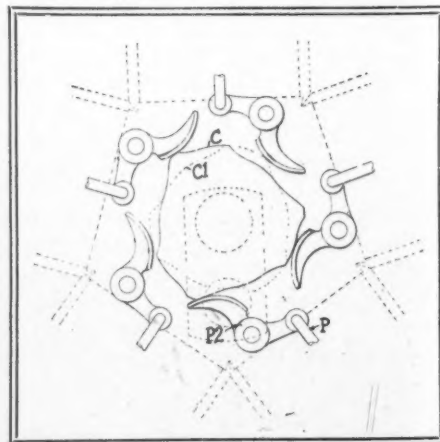
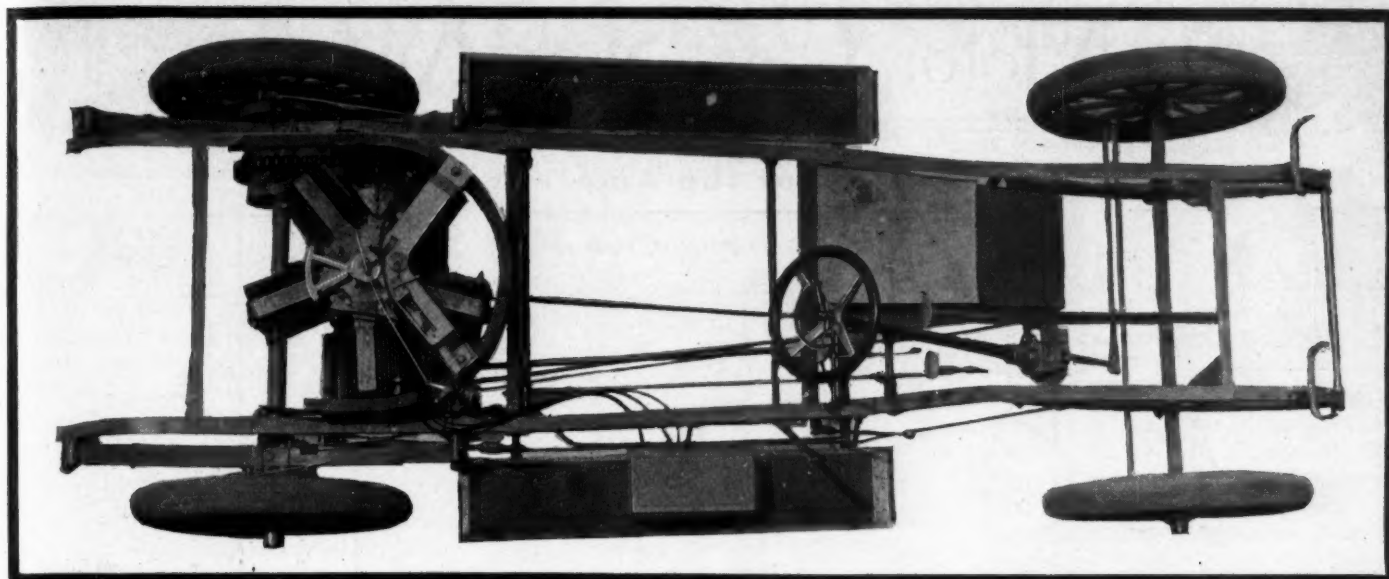


FIG. 2—CAM DIAGRAM



CHASSIS OF ADAMS-FARWELL CAR WITH

out stroke. When diametrically opposite to No. 4 they will be at the inner end of the stroke. Thus, as the five cylinders bolted firmly together to a hublike crankcase revolve, the pistons reciprocate in the cylinders, thus performing in perfect sequence the four functions of cycling. The valves are located in the cylinder heads and opened by rocker arms with push rods paralleling the cylinders on their lower sides. One diagram illustrates the single cam construction and valve operation. On the lower end of the crankshaft is the two-part cams C, CI—Fig. 2. The latter, shown in dotted line, is the movable half for controlling the intake valve period of opening. Both parts of the cam are stationary. On each of the five cylinders is a push rod P, the inner end of which has a peculiar foot P2 pivoted on the crankcase with the curve portion bearing upon the cam and the short, straight arm connected with the push rod P. As the cylinder revolves the rounded foot follows the contour of the cam, which has been designed so the four cycles follow one another in order as they do in a four-cycle vertical engine.

The oiler employed on the motor is a four-feed plunger type, the four plungers being carried in a rotating member, with the reciprocation of the plunger produced by two end cams. The sectional illustration, Fig. 3, shows the casing A, the rotating member driven by gear. Two plungers D appear, and at their ends are the cams E and F, cam E to force each plunger in turn toward the right, and cam F to force it leftward. Revolving the cylinder brings each plunger D in turn around so the opening G, through which oil is drawn into the cylinder when the plunger is pushed out by the cam F, registers with a port. As the cylinder revolves the opening G soon will register with the outlet opening GI, at which time the cam E, forcing the plunger D rightward, sends two drops of oil through the lead GI to a bearing. Each of the four

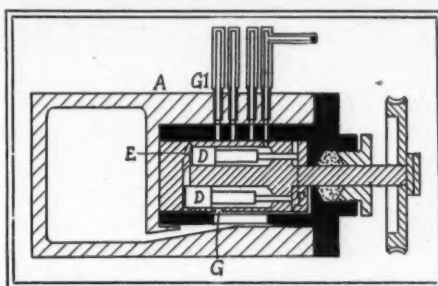


FIG. 3—ADAMS FOUR-FEED OILER

plungers has its openings G and GI for taking in oil and delivering it to the oil leads.

The selective transmission with the cover removed, which is illustrated, adds its little note to the paradoxism of the machine by having its shaft located transversely of the car, carrying the double-cone clutch M within it and driving by single chain from a sprocket S at one end. The bevel gear K constantly meshes with the bevel on the crankcase and so receives the power from the motor. The reader should follow how the power passes from the bevel K to the sprocket S through the mechanisms of the gearset. The bevel K and the external part of the clutch M are on a sleeve, whereas the gear A and the internal part of the clutch are on the

ITS FIVE-CYLINDER REVOLVING STAR MOTOR

shaft carrying the sleeve. This shaft is in alignment with the shaft Y and can be coupled with it by jaw clutch B. To get direct drive gear C is moved to gear A as illustrated, the jaw clutch B coupling the shaft Y with the shaft carrying the clutch M. This done, engaging the clutch M locks the gear K to the shaft Y on which is the sprocket S for chain drive. For intermediate speed gears E and A are meshed, and also gears C and F, the power then passing to the countershaft X and then back to the squared shaft Y carrying the sprocket S. For slow speed gears A and E transfer to the countershaft and gears D and G transfer to the shaft Y. In reversing G meshes with the idler H, which is of sufficiently wide face to also mesh with gear D when it is moved endwise. When not in use the idler H does not revolve. The clutch M is of the double-cone type. The central cone is of bronze with cork inserts, and the external and internal cones of cast iron. The eccentric O is for driving the gasoline pump supplying the carburetor. The housing N covers a ratchet wheel keyed to the shaft carrying the gear A and is connected to the driver's seat so the motor can be cranked through the gearset.

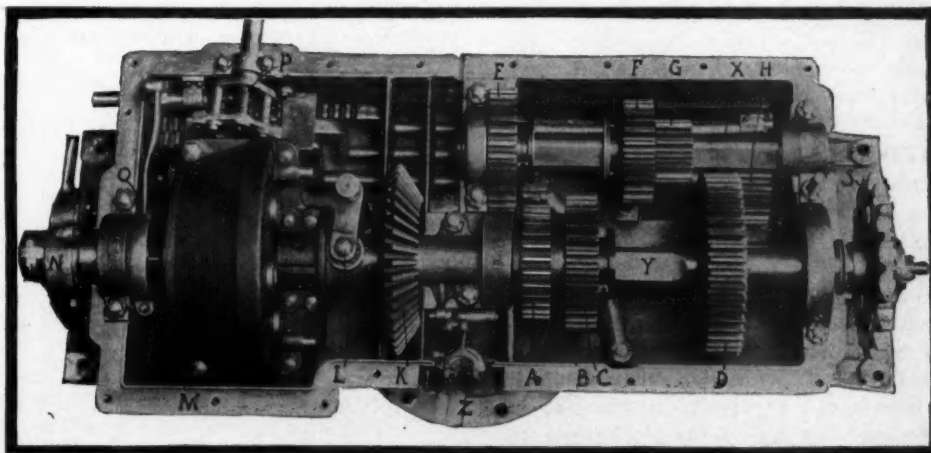


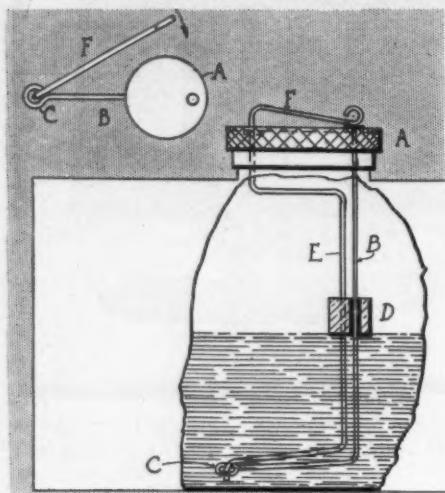
FIG. 4—ADAMS THREE-SPEED SELECTIVE SET CONTAINING CONE CLUTCH



Motor Car Shop Kinks



HANDY IMPROVED GASOLINE GAUGE



NEAT GASOLINE GAUGE

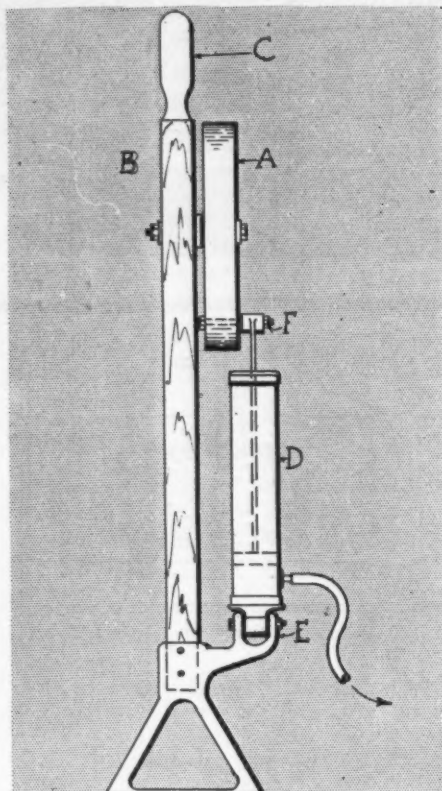
To tell how much gasoline there is in the tank is always a matter of guesswork, and a stick is not always handy. An easy way to make a gauge that is always reliable is as follows: Drill a hole in the tank A cap near the edge, and get a strong and stiff piece of wire B long enough to reach to the bottom of the tank A. Bend one end at right angles about $1\frac{1}{2}$ inches long and make a small eye C on the end. Get a small cork D and in the center of it put a piece of tubing so it will slide up and down freely. Put the cork on the wire and put it in the tank. Stick the wire through the hole in the cap, and see that the wire is straight up and down and that the end of the wire with the bend in it is on the bottom of the tank. Solder the wire to the cap A where it is. Get another wire E as stiff as the other one and bend it as illustrated. Fasten on the other one. A catch should be soldered on the top of cap A to hold the wire against the cork when it is drawn out. Before the cap is unscrewed to see how much gasoline is in the tank, pull the wire lever F, as indicated by arrow in plan view, over on the catch on the cap A. This done, the wire will hold the cork D at the height the gasoline is, making a very easy way to find out how much gasoline there is in the tank.

TAKING A NUT OFF CAMSHAFT

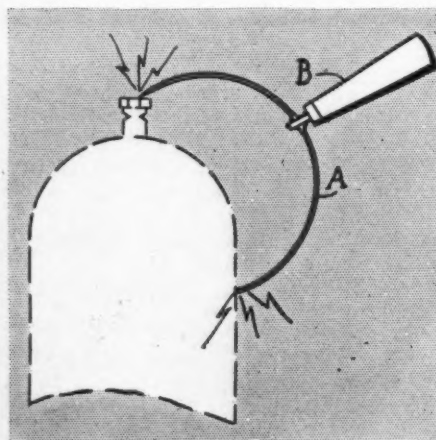
Occasionally, the nut holding the two-to-one gear on a camshaft will resist turning by the application of ordinary force. It then becomes a problem to get the nut off without risk of springing the shaft or breaking the gear. One device for accomplishing this is illustrated. A plank A has a hole cut in it through which a wrench can be applied to the nut in question. The end of the plank rests on the floor and is held in place by blocks

Aids For the Amateur

POWER PUMP FOR TIRE INFLATION

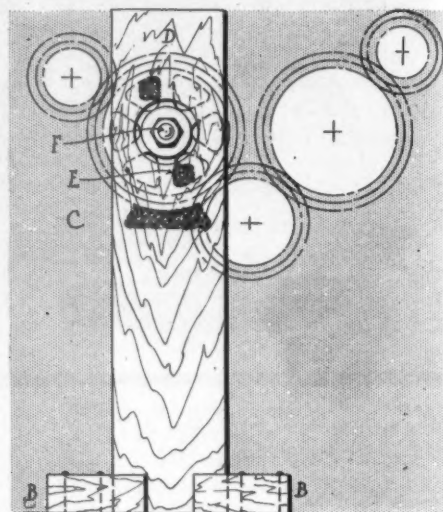


BB. Other blocks C, D, E are nailed to the reverse side of the plank in position to bear snugly against the bottom teeth and two spokes of the gear. A wrench can then be applied to the nut F and turned in the direction of the arrow with any reasonable force without danger. The longer the wrench, of course, the smaller will be the force required. It takes but a few minutes to complete a device of this nature, and the results obtained are particularly valuable to the motorist far away from the factory.



DEVICE FOR TESTING SPARK PLUGS

TAKING NUT OFF A CAMSHAFT



SPARK PLUG TESTER

As it is a rather difficult job testing spark plugs to find out which one is misfiring, of course, on a coil and battery system it is easy enough to hold down the vibrator in turns for each cylinder; but on a high-tension magneto it is not so easy for this purpose. A very simple device made as follows can be used: Take a piece of stiff wire A and bend it semi-circular as shown in the illustration, fastening a handle B on it. A handle off of an old electric light knife switch will make a good one. To test a plug touch the top of the plug with one end of the wire, and with the other the cylinder; if the other three cylinders fire all right the one the wire is on is the bad one.

SIMPLE POWER PUMP

Out of an oak board 1 inch thick cut a disk A 7 inches in diameter, drill a $\frac{1}{2}$ -inch hole in the exact center. Next cut an oak strip B 18 inches long and $1\frac{1}{2}$ inch wide; turn a handle C on one end, and on the other end fix a handle as shown. Now with a $\frac{1}{2}$ -inch bolt $2\frac{1}{2}$ inches long fasten disk to oak strip with a washer between. Next get a good strong and rather short bicycle pump D and fasten to support E. Make a head F on the end of the piston rod, with a hole through it, and with a strong wood screw fasten it to the disk A about $\frac{1}{4}$ inch from the edge. Be sure the piston reaches the bottom of the cylinder before the piston rod is cut the right length. The cylinder must be pivoted at the end E so it can move back and forth when the disk A revolves when it is held against a rear wheel. Fasten a rubber tube to the pump long enough to reach all the wheels, with a valve connection on the end; jack up a back wheel, engage low gear and hold the disk against the tire.

THE NADALL DEMOUNTABLE RIM

WITH the present trend towards what will ultimately result in the general use of demountable rims, comes the announcement of the Nadall rim, manufactured by the Nadall Mfg. Co., 1223 Michigan avenue, Chicago, which rim was placed on the market in February of this year and since which time it has been in constant use on the largest types of American and foreign cars with success. Berne Nadall, inventor, uses in his rim a principle for anchoring the rim on the wheel which is different than that employed by other makers, and which possesses a peculiar advantage of not having a single loose part when the rim is changed. A further point in connection with it is that it is a universal rim, in which clincher, quick detachable tires or mechanically fastened tires can be used with equal facility.

Its construction is illustrated in Figs. 1 and 2, Fig. 1 showing a perspective view of the fastening device, as shown when a wheel felloe with rim and tire would be cut in two. The method of anchoring the clincher rim carrying the tire is by forcing an expanding shoe S into a recess G on the under side of the clincher rim, there being three of these anchoring shoes in a ten-spoke wheel and four in a twelve-spoke wheel. This illustration shows the shoe S in position anchoring the rim in place. To remove the rim, rotating the nut H, which is part of a hollow threaded sleeve, lowers the shoe S, in that the hollow sleeve threads into the internal sleeve C embedded in a mortise in the felloe F. Each expanding shoe S is a cold rolled steel member 3 inches in length measured circumferentially, $\frac{1}{2}$ inch in radial depth at the center, and 1 inch wide. The curvature of the face of the shoe S, as seen in Fig. 2, is of the same radius as that of the recess G into which it fits in the rim, but, as also illustrated, this curvature is much greater than that of the inner surface of the clincher rim, the result being an anchorage between the shoe S and the clincher rim which does not tend to break the clincher. Still further of importance is that the shoe S has its edges beveled to 20 degrees, so that as it is raised into the recess G it presses in three directions—radially, or upwards, and to each side at an angle of 20 degrees.

In disengaging the shoe S from the rim, the nut H, acting through its threaded stem with which it is integral, bears upon the locking means N, which is a non-rotating fit on the rod M, this rod extending through the hollow nut and stem H and attaching to the shoe S. The interposed spiral spring serves to retain the teeth on the upper surface of N in the base of the stem H, thereby giving a positive locking arrangement. The threaded cap K is for the prevention of dust entering the mechanism.

As a preparation for this rim, the felloe

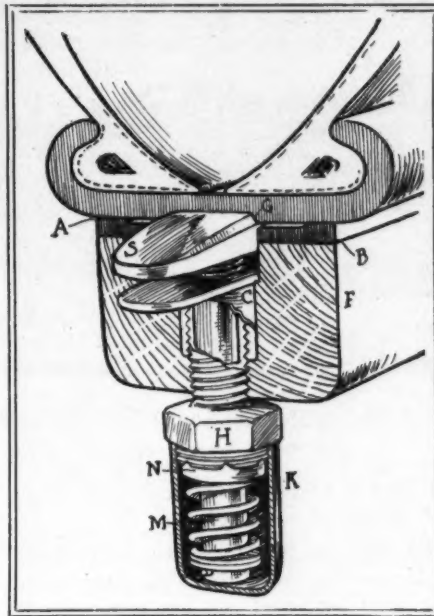


FIG. 1—NADALL RIM

F of the wheel has shrunk on it a 3-16-inch crucible steel band B, and on this are $\frac{1}{8}$ -inch feet A to retain an air space between the rim B and the demountable clincher rim. The demountables are made with or without this, some makers preferring it because they think it makes the removing of the rim easier after long usage. In a ten-spoke wheel the three expanding shoes S, illustrated in Fig. 1, are located at regular intervals in the half of the wheel opposite to the hole in the felloe for the valve stem, and the feet A are distributed in that half of the felloe containing the valve stem. At each side of the valve stem are guide pins on the clincher demountable, fitting in recesses in the band B on the felloe. In actual practice with a ratchet wrench, which is a little slower than the breast type of wrench used on demountables, one man can remove the Nadall demountable clincher rim and replace it in slightly over 1 minute. The thickness of the clincher rim generally used is 12-64 inch, and making the recess G for the expanding shoes 3-64 inch deep leaves a big margin of safety in the rim at this point. The rims are made so as to be interchangeable on ten and twelve-spoke

wheels, in spite of the fact that three shoes are used for anchoring one type and four shoes for the other type.

THE VACUUM MUFFLER

J. A. & C. A. Xardell, Utica, N. Y., manufacturers of the vacuum muffler, employ in this muffler the principle of using it to create a suction upon the exhaust gases coming from the engine. The muffler consists of an elongated cylinder divided into two compartments, the smaller perfectly air-tight acting as the vacuum chamber; the second, or large compartment, designed to silence the exhaust, divides the gases into innumerable small jets and finally delivers them through an open port. According to test, with a pressure gauge attached to the muffler and the vacuum gauge attached to the vacuum chamber, the exhaust from a four-cylinder motor with 5-inch bore was turned through it with a result that no pressure was shown under gauge attached to the muffler and the pulsating vacuum indicated on the gauge attached to the vacuum chamber. This experiment apparently showed that immediately after the explosion the vacuum formed in the muffler relieved itself by drawing gases from the exhaust pipe, which naturally worked against any back pressure on the motor.

LOCOMOTIVE CARS FOR 1909

The American Locomotive Co., Providence, N. Y., will continue the manufacture of its present style of cars for the 1909 season, but of particular interest in connection with these will be the change in name from Berliet to Locomotive, the reason for this being that the company's contract with the French Berliet manufacturer has expired, which contract allows the American Locomotive Co. to perpetuate in its models any features of the French design used during the life of the contract. It is understood that some unfavorable features of the contract were those making it compulsory to duplicate in the American machine every feature of the French, which was a difficult problem due to the different road conditions of America. In the 1909 cars, while the general principles will remain the same, not a few detailed improvements will receive attention.

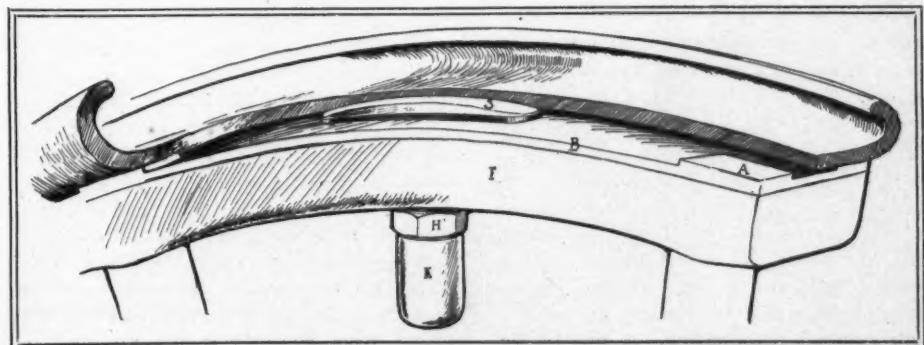


FIG. 2—SHOWING ANCHORING WEDGES IN NADALL RIM



TESTING TRACK, TREATED WITH TARVIA, USED TO TRY OUT RAMBLERS AT KENOSHA, WIS.

Will Vote for Roads—The question of submitting the county good roads question to the voters of Calhoun county, Mich., will be voted upon at the November election. The Battle Creek Industrial Association is at the head of the movement.

Long Road Planned—Milwaukee owners are pushing the project of building a motor trolley and public boulevard, 100 miles long and 144 feet wide, from Chicago to Milwaukee. The Chicago-Milwaukee Road and Realty Co., capital stock \$500,000, has charge of the scheme, which will mean an outlay of \$10,000,000. The work will require 5 years' time to complete.

Acme Gets Race Quarters—Cordner & Flinn, who have entered an Acme car in the Vanderbilt race, have secured quarters for the race at Babylon at the cottage of Dr. William R. Bross. The firm was casting about for suitable quarters when Dr. Bross offered them the cottage. The doctor is an enthusiastic Acme owner and his offer was gladly accepted by the New York agents. The Vanderbilt car will be taken to the Bross cottage in about a week, it is said.

Information on Tap—Believing that many motorists who are interested in touring are frequently deterred from taking trips to distant countries owing to lack of information regarding routes and roads, the California promotion committee has sent the following letter to various organizations. The committee will furnish this information to all who may ask for it. The letter follows: "The ever increasing motor travel in California calls for complete information regarding the different counties in the state, their characteristics, and more especially road conditions therein. The wise traveler is the one who secures in advance all the particulars that will be helpful in planning a long journey. To this end the California promotion committee is prepared to supply, without cost, to all persons interested in California, and who intend at some time to make a motor trip in the state, with full particulars, photographs, road maps, guides and other valuable information. A line to the committee at its headquarters, California

building, Union square, San Francisco, is all that is necessary to receive in return this desired information."

Connecticut Growing—The membership of the Connecticut Automobile Association has been increased by the admission of the newly formed Litchfield County Automobile Club of Torrington which has 116 members. There are now seven active clubs in the state association.

Test for New Jackson—The Jackson Automobile Co., of Jackson, Mich., plans to send one of its 1909 four-cylinder 30-horsepower models on a trip from the factory to New York city the latter part of the month. E. P. Blake, the Boston agent, and C. G. Percival, publicity manager, will make the trip, the car being driven by McArthur.

After Dust Demon—Further experimenting with dusty country roads will be done by the Lucas county commissioners, when 2½ miles of Monroe street, Toledo, will be treated with an asphalt preparation, at the expense of the Good Road Improvement Co. and without an outlay by the county. Another strip of the same road will be oiled by the Indian Refining Co. within 2 weeks, to permit of a comparison of the methods of treatment. The last effort along this line was not a decided success.

Is a Back Number—In the opinion of a prominent Wapping, Conn., farmer the motor car is the greatest plague that exists on the country roads for the residents that suffer in consequence. He states: "The evils are numerous—fast running, the smell of gasoline, the immense clouds of dust, the destroying of roads, the fear of danger of meeting them and the destruction of fowls." This individual is of the opinion that people can no longer enjoy their lawns and verandas in the good old summer time. He is apparently something of a timer, for he has discovered cars that actually went 80 miles an hour, and asks if the next legislature will stand for this sort of thing. He furthermore contends that the roads of today are a failure, bad for the horses' feet, etc. He winds up with a plea for the old roads, meaning presum-

ably, the soft country dirt variety, where one wallows in the mud after a heavy rain. His neighbors, however, drive cars and seem pretty well satisfied with things in general.

Many on Buick Picnic—Owners of eighty Buick cars took part in the annual picnic promoted by the Chicago branch of the Buick Motor Co. last Sunday. The motorists drove to Trout's park, near Elgin, where a chicken barbecue and picnic kept everyone happy until late in the afternoon.

Firemen Want New Car—About a year and a half ago the board of contract and supply purchased for the Hartford fire department a two-cylinder Knox combination chemical and hose wagon. It is now the intention of the fire commissioners to install a motor of increased power and an appropriation to cover the change will be asked for. The car has done very good service since it was installed.

Will Improve Bad Spots—Contracts let during the past week by the Connecticut state highway commission look toward the immediate betterment of many bad spots throughout the state. The South Windsor oil stretch on the east side of the Connecticut is beginning to show signs of fast driving and the conservative faction is not at all pleased with the condition of affairs. Some of the indiscreet drivers have made many enemies among the agriculturalists of late by their fast driving on the highway.

Novel Race Proposed—One of the most peculiar motor car contests of the year will be the race between the Kisselkar and the White from Los Angeles to the top of Mount Baldy next Monday. The course is 100 miles in length over steep hills and rough sandy road. The race is for \$1,000 a side. Leon T. Shettler and F. C. Fenner have made the wagers. The Kissel will be driven by Bert Latham and the White will be piloted by H. D. Ryus, an employe of the White company. The race starts over 25 miles of level road. Then Newhall grade, 30 percent at the worst place, is climbed. Through the Soledad canyon the cars encounter dif-

fiult twists and turns and much deep sand and numerous streams. From Palm-dale there is a desert stretch for 20 miles and the race ends with a 9-mile climb to an altitude of 7,000 feet.

New Kind of a Test—At a harvest home picnic at Kansas, Ill., a \$10 prize was offered for the lightest-running, most noiseless and best decorated machine in the ring. In the presence of about 2,500 people, the judges awarded the first prize to the Maxwell car, owned and driven by D. K. Woodruff, of Kansas, Ill.

Farmers Enthused—As a result of a good roads meeting held at Crystal Fountain park, addressed by "Good Roads" King, the farmers in that section of Defiance county, Ohio, have banded themselves together and will drag the roads according to the method advocated by King. He claims they may be kept in excellent shape all winter by going over them while wet with a drag made of split logs.

Ride for Friendless Women—Inmates of the Home for Friendless Women at Indianapolis were taken for a motor car ride in that city on September 3. The ride was arranged by Mrs. George Hanvey, who was assisted by motor car manufacturers and dealers. Seven cars were loaned with drivers by the National Motor Vehicle Co., Gibson Auto Co., Buick-Losey Co. and Fisher Auto Co. Refreshments were served to the party by the women of Woodruff place.

Meet for Milwaukee—Arrangements were made at the annual convention of the Wisconsin State Automobile Association for a 2-day race meet to be held in State Fair park, Milwaukee, on September 25 and 26. Programs are now being arranged. One of the features will be a novelty contest for members of "Judge Neelen's Automobile Club," whose "membership" includes all who have been arrested for speeding. The idea is to give these "members" a chance to beat their best time. There are more than fifty members in the club. It is practically settled that there will be a 50-mile and a 24-hour endurance contest. On Friday there will be a parade of cars.

Rambler's Dustless Track—The problem of the dustless for testing motor cars just out of the factory and the problem of preserving the macadam on motor roadways have finally been met by Thomas B. Jeffrey & Co. at the Rambler factory in Kenosha, Wis. After some years of experimenting with macadam under oil treatment and other road preparations, the Tarvia method was adopted. Every Rambler car, before it is delivered to the owner, is run for more than 200 miles on the testing track at the factory. The track has a dirt bottom on top of which is placed 8 inches of cinders and 3 inches of crushed stone screenings, well-watered and rolled with a heavy street roller to a smooth, solid surface, and sun-dried for 2

days. One application of 1 gallon of Tarvia to the square yard is applied. The track is $\frac{1}{2}$ mile in circumference and 20 feet wide.

Mountain Now Open—Mount Wachusett, one of the famous peaks in Massachusetts, is now open to motorists during the hours of 12 to 2 and 5 to 7 p. m. This is quite a concession. It has also been arranged that motorists who wish to, may stay over night and make an early morning departure.

Columbia Holds a Meet—The city of Columbia, S. C., had its first race meet on Labor day on the mile track at the fair grounds. The principal event, the 25-mile free-for-all, for the board of trade cup, was won by a 30-horsepower White steamer, driven by R. D. Lambert, his time being 30 minutes and 30 seconds.

Want a Consolidation—There is a movement on foot in Indianapolis to consolidate the Indianapolis Automobile Trade Association and the Indiana Automobile Club, but no definite steps have been taken. The latter club has been composed principally of owners while the membership of the former is entirely of those identified with the trade. The Indiana Automobile Club has not been very active for some time and there is some opposition to the merger, although it is not very pronounced. A meeting will be held early next month to take the matter up in detail and reach some decision.

Lucky Cities Named—The turnpikes within the city limits of Baltimore to be improved with the \$1,000,000 from the good roads fund have been selected. They are the Belair, Hartford, Liberty, Reisterstown, Falls, and Frederick roads, Franklin pike and Charles street extended. In all there are 14 miles of streets to be improved. The first work on the new roads in the state under the supervision of the good roads commission will be the construction of two strips of road in Caroline county. One is a stretch of a third of a mile between Denton and

Greensboro, and the other slightly more than a mile between American Corners and Federalsburg. A sand and clay combination is specified for the minor strip and shell will be used for the other.

New Club Gets Busy—The recently formed Automobile Club of Willimantic, Conn., has outlined a vigorous sign posting campaign and will expend surplus funds in this direction rather than otherwise. The members feel that thoroughly reliable signs distributed about the country are more to be desired than fine gold.

French Veteran Dies—One of the veteran racing car drivers of France, Adolphe Lavergne, died a few days ago. In almost all the big races such as the Gordon Bennett, Paris-Berlin, Paris-Vienna, Paris-Madrid, the French eliminating races and also among the early road contests when Panhards, Bollees and de Dions were only in the limelight, Lavergne was a starter. He generally finished, but he lacked the nerve and daring of some of the drivers who have become famous. Almost continuously since the Auvergne eliminating race of 1905, in which Lavergne drove a Hotchkiss and finished fifth, he has been in the employ of the manufacturers of these cars.

Keeping Track of Traffic—Something of a sensation was caused when it became known that a representative of the attorney general is on duty observing traffic over the Suffield-Thomsonville toll bridge. A bitter contest is being waged between the state and bridge owners and interesting developments are shortly expected. This structure is one of the many toll bridges spanning the Connecticut that is to be freed by the state, which purchases outright of the owners. The price agreed upon for other such structures has been satisfactory to all concerned, but the Thompsonville-Suffield faction are out for the most they can get. The observations of the sentinel are therefore of much significance and computations will be made accordingly.



B. F. GOODRICH CO. BRANCH MANAGERS AND SALESMEN AT ANNUAL MEETING AT AKRON, O.



NEW 1,000-POUND DUER DELIVERY WAGON OF MOTOR BUGGY TYPE

EACH succeeding week of the present year shows the adoption of the motor vehicle in some particular department of work not previously conquered by the gasoline machine. While new conquests are announced weekly, there is a corresponding enlargement in the use of motor vehicles in many other lines. One example of this is the adoption by the police department of Los Angeles, Cal., of a six-cylinder Gearless car made by the Gearless Motor Car Co., Rochester, N. Y. The special patrol body is provided with a searchlight, fire extinguisher, special stretcher for the injured, and other appliances. During the 8 months it has been in work its record has been good. This same department has placed an order recently for a fourteen-passenger patrol wagon which will be one of the largest used in this service throughout the country, it is declared.

MOTOR BUGGY DELIVERY

Something decidedly novel in the commercial line is the new 1,000-pound delivery wagon of the motor buggy type brought out by the Chicago Coach and Carriage Co., of Chicago, which concern has been building the Duer motor buggy for the past 2 seasons. The first delivery wagon built to special order attracted so much attention that the company at once decided upon devoting a percentage of its energies to this type of vehicle, and already others are on the assembling floor. This machine is a commercialized motor buggy with its 44 and 48-inch wheels front and rear, carrying 1½-inch solid rubber tires, and its flexible rope or cable drive, from a jackshaft to the rear wheels. Having 100-inch wheelbase permits of a carrying space 5 feet in length, giving capacity for 1,500 weight in emergency, which load the running gear is designed to carry. In the process of commercializing the Duer motor buggy, the company has strengthened the axles, bringing them up to square members with the cross members 1¼ inch to the side; the springs have been

increased and the ash frame made commensurate with the purpose of the vehicle. This car has a 10 to 12-horsepower two-cylinder opposed motor of the air-cooled type with cylinders 4 inches square. Its lubrication is by mechanical oiler feeding to the cylinders and bearings. Jump spark ignition with double sets of batteries is in vogue. The transmission employed is of the selective spur-gear type incorporated in the jackshaft, and offers two forward variations and one reverse. Control and steering are by side lever. A light delivery wagon of this nature with a speed of 15 to 25 miles per hour is well suited for a variety of uses.

UNCLE SAM'S MOTOR RIGS

The federal government, Washington, is gradually acquiring a stock of motor vehicles which are being used for a variety of purposes. The latest acquisition is a model 43 Pope-Waverley closed delivery wagon, which the quartermaster's department of the war department has purchased from the Pope Automobile Co., of Washington, for the use of the war college. The delivery wagon has a capacity of 1,200 pounds.

In Realm of the



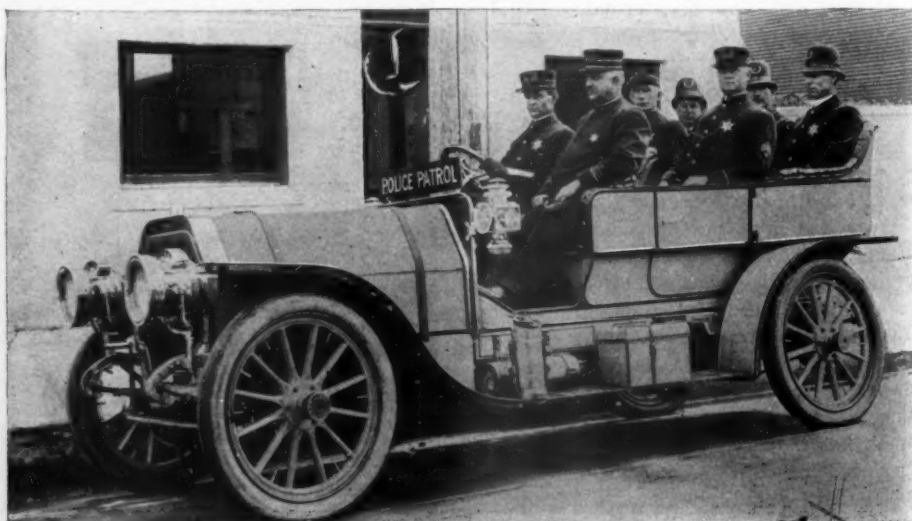
It is used for carrying mail and records between the war department and the war college. Four trips are made each day and about 35 miles are covered every working day. The battery is charged at the government's own station, which helps to keep down the cost of operation. The vehicle is giving great satisfaction and it is probable that several other government bureaus will purchase similar vehicles in the near future.

BUS SERVICE IN PORTO RICO

A motor car bus service, using White steam touring cars, has recently been installed between San Juan and Ponce, Porto Rico. A car leaves each end of the line each morning and makes the trip in about 6 hours. The new service has obtained popularity, and bookings must be made at least 10 days in advance in order to obtain accommodations. Since the United States took over the control of the island considerable road improvement work has been done, and the highway between San Juan on the north coast and Ponce on the south coast is now said to be in fair condition. The new bus service is particularly popular with tourists visiting Porto Rico, as it gives them an opportunity to see the interior of the island, which is not accessible by railroad.

AMERICAN TRUCK PROSPECTS

By a change in management the American Motor Truck Co., Lockport, N. Y., which has been manufacturing machines since 1904, hopes during the 1909 season to vastly increase its output. A factory development on a substantial basis began 2 years ago when the company secured a large building and began equipping it with



GEARLESS CAR USED AS PATROL WAGON AT LOS ANGELES, CAL.

Commercial Car



modern machinery and appliances in order to manufacture all parts of the vehicles at its own plant. This process of evolution in factory facilities continues, and plans are now completed for the manufacture of an increased output. The main erecting room, illustrated on these pages, occupies the ground floor throughout its entire length, which has an area of approximately 25,000 square feet. The 7,000 square feet of gallery space affords facilities for the majority of cutting work. In the testing room are 4,000 feet floor area, and the woodworking department is the same size. The equipment of the plant includes traveling trains for handling the heavy parts of the cars, air compressors for riveting, electric drills and a great many other parts.

BUSINESS IN LONDON

London advices are to the effect that the London General Omnibus Co. has in contemplation the conversion of a considerable portion of its fleet of gasoline motor omnibuses to the Clarkson system of steam traction, a step dictated by the satisfactory working of the Chelmsford omnibuses which the premier London company already has in service. In these chassis the newly designed generator is of the water tube type. The boiler consists of a central steel shell forged out of a solid ingot in a 1,000-ton press, this shell being machined inside and out and fitted on its outside with generator tubes in the form of a horseshoe, the top of the shell being enclosed in a removable cover. The whole arrangement of shell and tubes is placed within a casing. The control of the paraffin burner is achieved automatically, as is also the case with the feed water, the



INTERIOR OF THE PLANT OF AMERICAN MOTOR TRUCK CO. AT LOCKPORT, N. Y.

driver being left free for the management of the car in traffic. The first conversion of such a chassis to the steam system has now been carried out, and on a trial the vehicle is said to have run very smoothly and satisfactorily. A considerable reduction in weight of the engine has been obtained, and a feature, from the point of view of public service, is the comparative silence in working which has been obtained. It is claimed that under traffic conditions in London the steam omnibus of this type will work at a cost of \$2.05 per mile, an appreciable economy in fuel consumption having been achieved on tests extending over many hundreds of miles.

That the business done by the London motor bus and motor cab companies is less done by the London Road Car Co. during the same period was respectively \$1,169,745 this year and \$1,174,865 last not quite as bad as has repeatedly been reported of late may be seen in the receipts of some of the companies. The London General Omnibus Co., the second largest in the metropolis, reports that the

at the end of July of this year was \$2,964,660, whereas for the corresponding period of 1907 the total was \$2,951,030. The bus-year. The statement of the Vanguard Motorbus Co. is not out but an officer is reported to have informed a financial paper that there was a fair profit. These three companies are the largest of twelve in London, operating 885 out of a total of 1,068 in operation August 1. From the city records it is shown that on August 1, 1905, there were eighty-two motor vehicles—buses and the like—operated in the streets of London; 562 on August 1, 1906; 912 on August 1, 1907, and 1,068 on that day this year. The detail as to the vehicles is as follows:

Name of car	1905	1906	1907	1908
Straker & Squire.....	3	146	308	355
Miles-Daimler.....	44	221	312	312
de Dion-Bouton.....	56	139	173	80
Wolsley-Siddeley.....	1	1	31	29
Arrol-Johnson.....	...	...	5	20
*Darracq-Serpollet.....	3	12	8	16
Leyland.....	...	...	6	16
**Electrobus.....	12	29	31	13
Durkopp.....	2	23	5	12
*Clarkson.....	...	...	1	10
Armstrong-Withworth.....	...	...	...	...
Motor Omnibus Construc-	...	...	...	...
tion Co.....	...	...	8	7
Dennis.....	1	6	6	6
Maudslay.....	1	6	4	4
Brush.....	...	...	1	3
Thornycroft.....	2	1	1	3
Charron.....	...	...	...	...
Lacoste & Batman.....	...	8	17	1
Bellis & Marcom.....	...	...	...	1
Hall.....	...	...	...	1
Brillie.....	1	15	15	...
Scott & Stirling.....	8	21	...	...
Schrelber.....	...	11	...	...
Orion.....	1	9	9	...
Decomun.....	...	4	...	...
Germain.....	5	2	...	...
Turgan.....	...	1	...	...
Total.....	82	562	912	1,068

*Steam. **Electric.

Companies and cars used by them to August 1:

	1905	1906	1907	1908
Vanguard Motorbus Co.....	...	...	349	381
London General Omnibus Co.....	6	84	187	267
London Road Car Co.....	19	90	201	237
Great Eastern London Motorbus Co.....	...	36	55	79
Thomas Tilling.....	12	31	34	36
Metropolitan Steam Omnibus Co.....	...	...	...	20
London Central Omnibus Co.....	...	...	6	16
London & Northwestern railway	...	...	2	5
Amalgamated Motorbus Co.....	...	...	4	4
Newman.....	...	2	3	3
General Motor Cab Co.....	...	...	...	3
Balls.....	...	...	...	1



WHITE STEAMER USED IN MOTOR BUS SERVICE IN PORTO RICO



STODDARD-DAYTON PLANT AT DAYTON, O., SHOWING THE RECENT ADDITIONS

Tire Repair Plant Moves—The Franklin Vulcanizing Works, of Chicago, have moved from 1057 Grand avenue to new and larger quarters at 391 Franklin boulevard, where the tire repair business will be continued.

New Monarch Agents—The Monarch Motor Car Co., of Chicago Heights, Ill., announces the following agents for 1909 in the territory indicated: J. E. Garnett, Kansas, with headquarters at Wichita; G. Ludemann, northeastern Iowa, with headquarters at Parkersburg; Harry M. Martinstein, Colorado, with headquarters in the city of Denver.

Appersons Place Many Cars—The Apperson Brothers Automobile Co. has closed 1909 selling agreements with—and in each case for an increased number of cars—all its 1908 dealers with the exception of one, it is stated. George H. Strout, sales manager of the company, left Kokomo last Friday on his annual trip to the Pacific coast in the interest of the company. He will visit the principal cities in Colorado, Utah, California, Oregon, Washington, Montana, Minnesota and Wisconsin before returning to the factory.

Pope Reorganization Assured—Albert L. Pope, one of the receivers of the Pope Mfg. Co., says: "The plan of reorganization of the Pope Mfg. Co. is assured of completion. Everything is moving along smoothly and a large percentage of the securities have been deposited and the reorganization will be completed in a very short time." It is said that about 90 per cent of the preferred stock has been deposited and promised in the reorganization plan. It is expected that the reorganization of the company will be effected about the first of November. The final proceedings of the receivers will of course be the application to the courts for authority to sell out the plant to the reorganization faction. The receivers have filed their August report of business with the superior court

which shows that during the month the cash receipts were \$54,943.66, the disbursements being \$66,776.30 and the sales \$43,041.12.

Bacon Haynes' Sales Manager—Richard Bacon, Jr., formerly manager of the Cleveland branch in Chicago, has succeeded C. B. Warren as sales manager of the Haynes company, while Warren becomes a representative of the Stearns in the territory west of Utah.

Addition to Rambler Plant—The seventh annual addition to the Rambler factory at Kenosha, Wis., is about to be made by Thomas B. Jeffery & Co. Ground is being broken for a solid concrete building 257 feet by 150 feet, making a total of 38,500 square feet of floor space to be added. The new building will be used by the final test department.

New Peerless Buildings—Within the next few months the Peerless Motor Car Co., of Cleveland, will begin the expenditure of \$750,000 for new buildings, equipment, etc., for the McGeorge Engineering Co. has been authorized to proceed with the drawing of plans that will amount to practically a duplication of the present plant. The new structures will be just north of the present buildings. The structure to be erected in the near future will be a repair shop 53 by 130 feet long. It will be three stories, of reinforced concrete floors and steel frames. The cost will be in the neighborhood of \$26,000. The rest of the building in the new arrangement will be upward of \$350,000 and with machinery will represent an outlay of \$750,000. This will include the repair shop and a new erecting and assembling building with machine shop, in front of which structures will be the administration and shop offices respectively. When completed the front will be of attractive design. The present plant, consisting of machine shops, erecting and assembling shops, foundry and other departments, is

two stories. The extensions will all be three stories. The plant as it now stands was developed in about 3 years. A 50-foot street will separate the present and new groups. The construction as planned will take about 2 years altogether.

Franklin Plant Expands—The H. H. Franklin Mfg. Co. is just getting into the latest addition to its factory. This addition is a concrete fireproof building 97 by 62 feet, five stories high. This building will also permit of a greater production of commercial vehicles and motor cabs.

Receiver Discharged—The National Battery Co., of Buffalo, states that the receivership under which the concern had been operating since February 1 was terminated August 19, and that all claims against the National Battery Co. have been settled and the entire property has been restored to the stockholders. Full control of the reorganized company has been secured by the Cutler-Hammer Mfg. Co., of Milwaukee, maker of battery-charging rheostats and other electric-controlling devices.

Shanks on Long Tour—Charles B. Shanks, sales manager of the F. B. Stearns Co., has started from Cleveland, O., for Denver on a 60-horsepower, 1909 model, light touring type body. Frank W. Leland is accompanying Shanks. It is the plan of Sales Manager Shanks to go after the western market a bit more aggressively than in the past. Denver, Salt Lake City, Los Angeles, San Francisco, Portland, Tacoma, Seattle, Vancouver and Spokane will be included in the itinerary. Since Mr. Shanks accepted the sales management of the Stearns company, 30 days ago, contracts for cars averaging 50 per cent more in quantity than the volume done during 1908 have been closed in the principal eastern countries and west as far as St. Louis, it is said, Chicago and St. Louis agents have both ordered 100 per cent more cars for 1909 than they disposed of

this year. Just now extensive additions are being made to the Stearns factory to accommodate new machinery and other demands for floor space, incident to the proposed production increase.

Meteor Branch in Chicago—The Meteor Motor Car Co., of Bettendorf, Ia., has opened a branch office in Chicago at 1233 Michigan avenue. B. D. Hurd, of Bay City, Texas, has taken the Meteor agency for the north and eastern half of the state of Texas. The Meteor company announces it has completed deliveries on 1908 cars and that it has been delivering 1909 models for the last 30 days.

Another Speedwell Building—The Speedwell Car Co., of Dayton, O., is again laying the foundations for a new building 50 by 150 feet. Part of it will be used for an increase in the upholstering department and part for an increase in the final assembling department. This is the ninth building to be erected under the administration of General Manager Loomis, who states that over half the product for 1909 has already been contracted for.

Frank Staley Withdraws—After 14 years with the H. T. Hearsey Vehicle Co., Indianapolis, Frank Staley, vice-president and general manager, disposed of his interests last week to Fred I. Willis, who has been with the company several years. Willis becomes the new general manager and at an early date the name of the company will be changed to the Hearsey-Willis Co. The company originally sold carriages exclusively, but when bicycles were much in vogue it added a line of them. Later motor cars were taken on and under the personal direction of Staley the company built up one of the largest motor car trades in the state. Staley has been president of the Indianapolis Automobile Trade Association since it was organized some time ago. He has left for a long visit to the Pacific coast, but probably will engage in the motor car business in Indianapolis upon his return.

G & J Tire Prices Reduced—"It's a long story briefly told," said the sales manager of the G & J Tire Co. when asked for an explanation of the reduction in prices which took effect September 1. "To manufacture a moderate output requires precisely the same overhead expense for factory administration as a big output, and practically the same selling expense is involved. The 1908 G & J tire, when brought out last fall, met with such favor that we were encouraged to nearly double the already large equipment we had installed to manufacture it. Another important factor heretofore has been the large number of replacements required under the guarantee put on the tire. Our guarantee is still there, but our replacement department has been practically idle this summer. The tires have stood up so well that replacements have been an insignificant item of expense. All these things have naturally reduced the cost of

production, and as soon as we became certain of this we decided that the quicker we gave the consumers the benefit of the reduction the better it would be for us and for the motor game in general."

Worrell Leaves Pope—Charles E. Worrell, who has been with the Waverley branch of the Pope Motor Car Co., Indianapolis, for some years, has resigned to accept a position with the sales department of the Overland Automobile Co.

McDermid Succeeds Twyman—Herbert McDermid was selected last week to take charge of the state department of the Gibson Auto Co., Indianapolis, succeeding B. W. Twyman. Until recently McDermid has been in the newspaper business. Twyman left the Gibson Auto Co. 2 weeks ago to organize the Motor Car Sales Co.

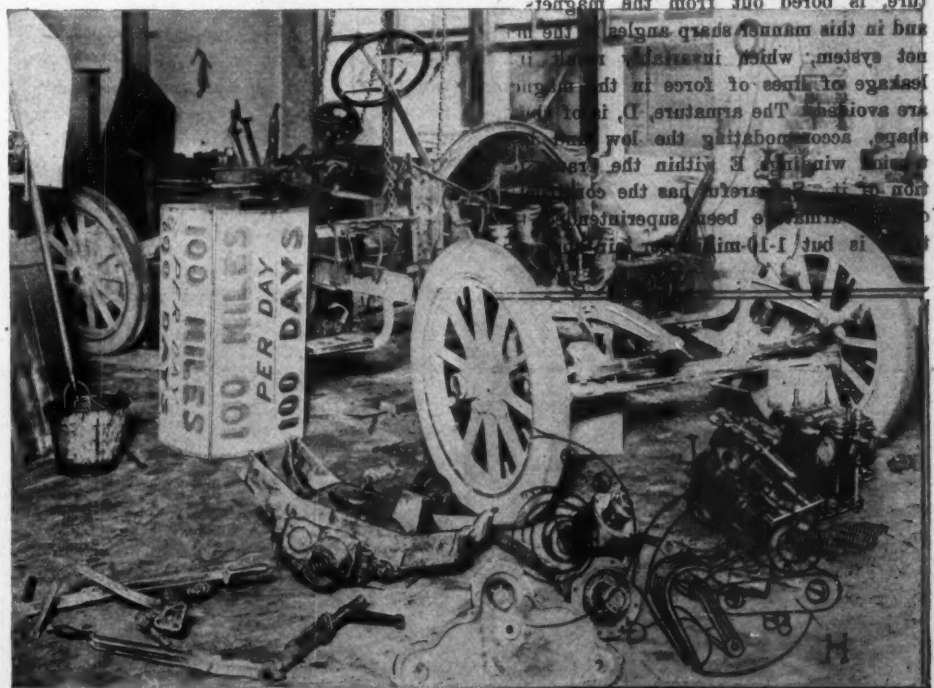
Stewart Has New York Branch—The New York branch office of the Stewart & Clark Mfg. Co., maker of Stewart speedometers, has been established at 1878 Broadway. There is a store room on the first floor, while in the basement there are facilities for cars which are being equipped with speedometers by the Stewart & Clark people.

York Declares Dividend—A 6 per cent dividend on the \$100,000 capitalization of the York Motor Car Co. was declared at the annual meeting of the company. The condition of the affairs of the company led it to decide on a more aggressive policy for the coming year, which with the enlarged quarters will increase the output more than 100 per cent. The new models decided upon for the season of 1909 are a 30-horsepower touring car and a 20-horsepower runabout. All the old models will be kept on the market with the exception of the 20-horsepower touring car. The stockholders elected these officers for the

ensuing year: President, R. B. Bailey, Philadelphia; vice-president, T. C. O'Connor, New York; secretary and treasurer, Oscar Stenstrom, New York; general manager, James A. Kline, York, Pa.

Hartford Tire Men Confer—A 2-day conference of the branch managers and field representative of the Hartford Rubber Works Company, Hartford, Conn. The out-of-town representatives arrived Saturday afternoon and Sunday they were in the city. In addition, the party included W. H. Field, Vice-President of the company, Treasurer, Harry Plough and J. L. Krough. Two shifts of men have been employed by the rubber company since April, and the various managers visited the home office to become thoroughly familiar with the plant and the methods and processes of the manufacture of the Hartford tires.

New Palace Poster—A pictorial poster for the show, which opened in Grand Central Palace, New York, on New Year's eve, has been selected by the show committee of the American Motor Manufacturers' Association. It is a two-foot square sheet poster. The theme of the drawing is a comet showing a huge red meteoric car shooting through an imaginary sky leaving behind it a trail of lurid yellow which gives the poster an unusual and dramatic life and action. The background is blue, representing the sky. On the yellow tail of the comet printed in red are the words "Ninth International Automobile Show," while the remainder of the lettering is in blue and white, giving the place, date and management of the show. A smaller poster also will be issued.



PREMIER HUNDRED-CENTURY CAR AS DISSEMBLED BY CHAMBERLAIN'S TECHNICAL BOARD



Development Briefs

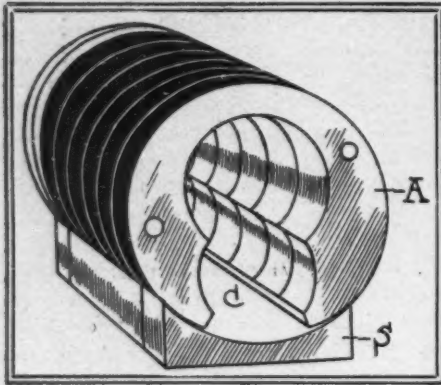


FIG. 1—HERZ MAGNETS

HERZ & CO., New York city, are marketing the Herz high-tension magneto manufactured in the European factory carrying this name. The magneto differs from the regular conventional type in that it is cylindrical in shape, due to the employment of ring shaped field magnets A—Fig. 1—in- stead of the horseshoe type generally adopted. The six Herz magnets are in reality as many flat steel rings clamped together with a polar space, or armature tunnel, C, cut in them. The ring surfaces are ground with the utmost accuracy in order to obtain the best magnetic effect when they are all clamped together. These magnets are mounted on an aluminum base S. A second unconventionality is that the usual independent, soft-metal pole pieces, which bolt to the ends of the horseshoe magnets in the conventional magneto, are dispensed with entirely. In the Herz system the space C, which accommodates the armature, is bored out from the magnets A, and in this manner sharp angles in the magnet system, which invariably result in a leakage of lines of force in the magneto, are avoided. The armature, D, is of shuttle shape, accommodating the low and high-tension windings E within the frame portion of it. So careful has the construction of this armature been superintended that there is but 1-10-millimeter air space be-

Herz High-Tension Magneto

tween it and the curved portions of the magnets A. The armature revolves on ball-bearings, mounted in special cages, and is fitted with lubricating means sufficient for many months' use. The armature windings consist of a primary winding, in which is generated the low-tension current and also a secondary winding in which is generated the induced, or high-tension circuit. At one end of the armature, and encased in a brass box, is the condenser F, Fig. 2.

The make-and-break devices for interrupting the primary circuit are illustrated in Fig. 3, the entire device being a detachable unit, which secures to the armature shaft by a key-way and feather. This make-and-break mechanism contacts with one end of the primary winding of the armature through a small carbon brush, fitted into the contact disk, which presses against a ring alongside of the ball race on the armature. The contact device consists of three parts: First, a curved spring G, having a platinum flat contact on one end; a steel block H carrying an adjustable platinum contact, and a small, hard-fiber roller K carried on a pin. This roller is set so that if it is given a slight push at the edge it tends to move up the incline plane formed by the steel piece H, and in doing so pushes against the end of the spring G and separates the platinum contacts L. This contact-maker revolves bodily with the armature, and in its rotation the fiber roller K strikes upon two steel projections M—Fig. 4—held in the case, thus breaking the circuit at the points of maximum induction twice in each revolution, at which time the induced current is set up in the secondary winding of the magneto. It is scarcely necessary to comment here that the primary and secondary windings are thoroughly insulated from each other, and that, with the making and breaking of the primary current and induced current, is set up in the secondary winding, which, be-

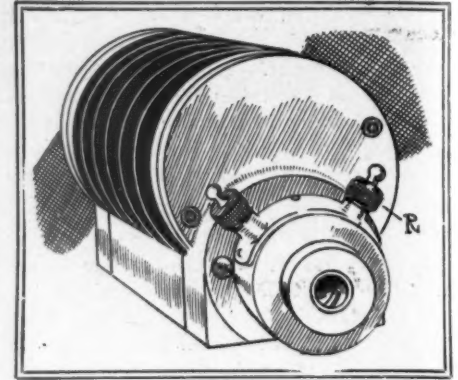
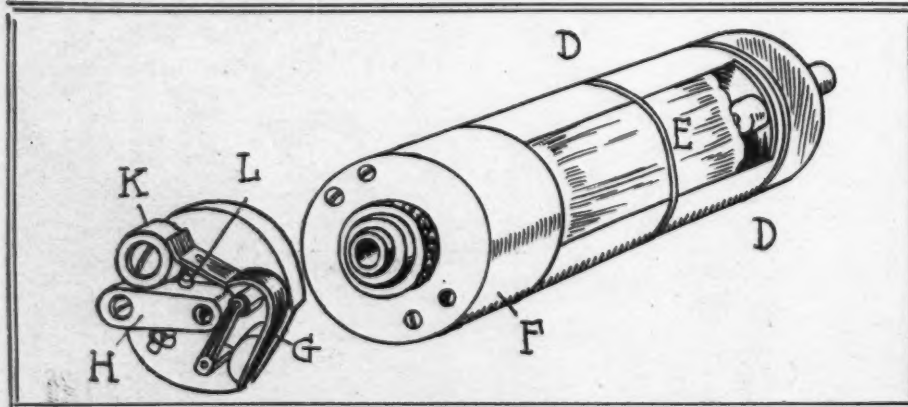


FIG. 5—HIGH-TENSION END

cause of the great many turns of wire in this winding, is of a particularly high voltage. For cutting off the spark when desired a terminal is provided on the contact-maker case, which gives a connection by means of a spring pressing on the head of a steel screw in connection with the insulated end of the primary winding, which thus can be short-circuited at will. In advancing or retarding the spark, connections are made with the ball-ending N, the contact-maker having a 30-degree movement for this purpose. The high-tension end of the armature has mounted upon it a deeply redressed insulating collar, with a metallic sector within it. Upon this sector press are small carbon brushes for drawing off the high-tension current. In Fig. 5 appears a magneto suitable for a two-cylinder engine with its high-tension terminal R located at 90 degrees to each other. To obtain the two sparks the high-tension contact piece or sector is fitted with an insulating collar, does not go quite half way round, and thus makes alternate contact with the two carbon brushes R, sending the spark to the respective cylinder. In four-cylinders a distributor is combined. The safety spark gap is located between the high-voltage sector and the armature, and if the spark exceeds $\frac{3}{8}$ inch it bridges the insulating collar to the armature.

M'CORD CLASS R OILER

McCord & Co. of Chicago have ready for next season a new class R lubricator which, while in most respects similar to previous oilers built by them, is slightly more compact and simpler. The battery of pumps, made in numbers from one to twenty, is carried in the reservoir and for each oiler lead are two pumps, one for forcing the oil from the reservoir through the sight feed and the other taking it from the sight feed and forcing it to the bearing. Each pump has the two plungers A and B; A delivering the oil to the sight feed C on the top of the oiler and B in turn delivering it through the outlet D in the oiler base to the bearing. The oiler is driven by revolv-



FIGS. 3 AND 2—HERZ MAKE-AND-BREAK AND ARMATURE

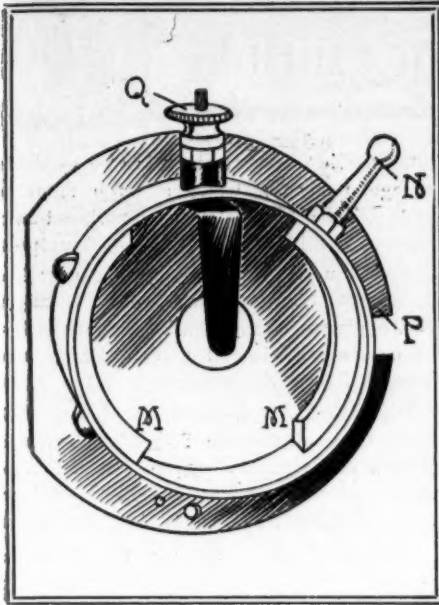


FIG. 4—HERZ MAGNETO ADVANCE

ing shaft E, driving a worm gear F on the shaft, of which are eccentrics for lifting and lowering the yoke H, which works the plungers A and B. By means of the adjusting screw M on the top of the oiler the wearing plate N can be raised or lowered and the vertical depth of the yoke H varied, thereby regulating the length of the plunger stroke and the amount of oil fed per stroke to the bearing. At the base of the plunger A appear the two check ball valves S and T; T guarding the passage through which oil is drawn from the pump reservoir on the up stroke of the plunger A, and S preventing oil being drawn out of the sight feed delivery tube P on the same plunger stroke. On the down stroke of the plunger the valve T shuts and valve S is lifted, allowing the oil to be forced up the tube P through the sight feed. The small portion of the illustration to the right shows the layout of the pump to force the oil to the bearing, the pump pulling its supply down the pipe PI, leading from the sight feed on the upstroke of the plunger B, the ball check valve SI allowing it to pass; on the down stroke of the plunger, this ball valve closing, the oil is forced past the other check valve to its bearing.

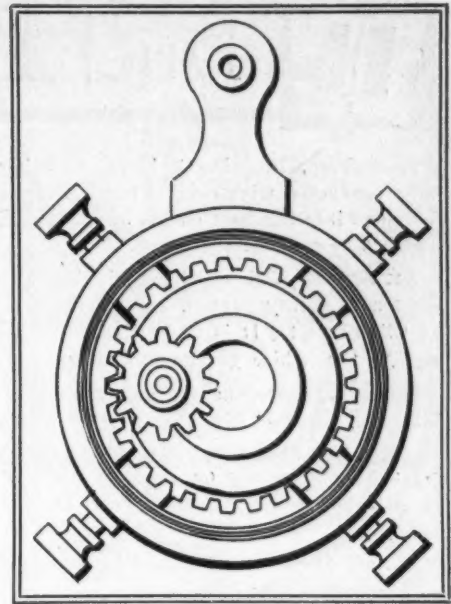
BACKE GEAR TIMER

The Backe Motor Co., Brooklyn, N. Y., offers something novel in the timer line which consists of an aluminum-cased timer into the casing of which is embedded an internal brass gear ring, and forming parts of which are four insulated segments 1, 2, 3, 4, each connected with a binding post to which attach the electric wires. The revolving contact is a brass spur pinion constantly in mesh with the internal gear ring. This pinion is carried on one side of the center tube, which forms the driven shaft of the timer so that when the engine is running the pinion is carried in a circle on this tube and in turn revolves on its axis. This type of timer should

be particularly positive in its operation. The timer is made for four and six-cylinder engines and whether for six or four each of the segments, 1, 2, 3, 4, is made with a sufficient number of teeth to contain the pinion for a time, thereby insuring a positive delivery of the current through that particular binding post.

KEYSTONE GREASES

The Keystone Lubricating Co., Philadelphia, Pa., manufactures a series of greases for use in transmission cases, differentials, rear axles, multiple-disk clutches, the timing gears of motors, and, in fact, all parts of a car except the cylinders. These greases are all made with a dry heat process instead of a steam heat process, the company claiming that by this process all of the water is removed from the grease, whereas, with the steam process it is barely possible to leave less than 2½ per cent of water. These greases are made from the liquid petroleum from which the mineral acids are first removed and then the petroleum brought to the required density by the dry heat process. The greases are made with different densities. No. 1 is used for all grease cups with spring or hand feed and is of the heaviest density. No. 2 is a medium and Nos. 3, 4 and 5 are suitable to use with a gun. Three and four are best suited for gearsets, and 5 and 6 may be used for disk clutches. Nos. 4 and 5 are semi-fluids, and No. 6 is a liquid. Nos. 5 and 6 may be used with a spring bottomed squirt can. The company has had numerous tests made by leading chemists of the country in order to determine the merits of these greases, these tests showing the co-efficients of friction of different lubricants, that of Keystone grease being .0034. In furnishing these greases to different

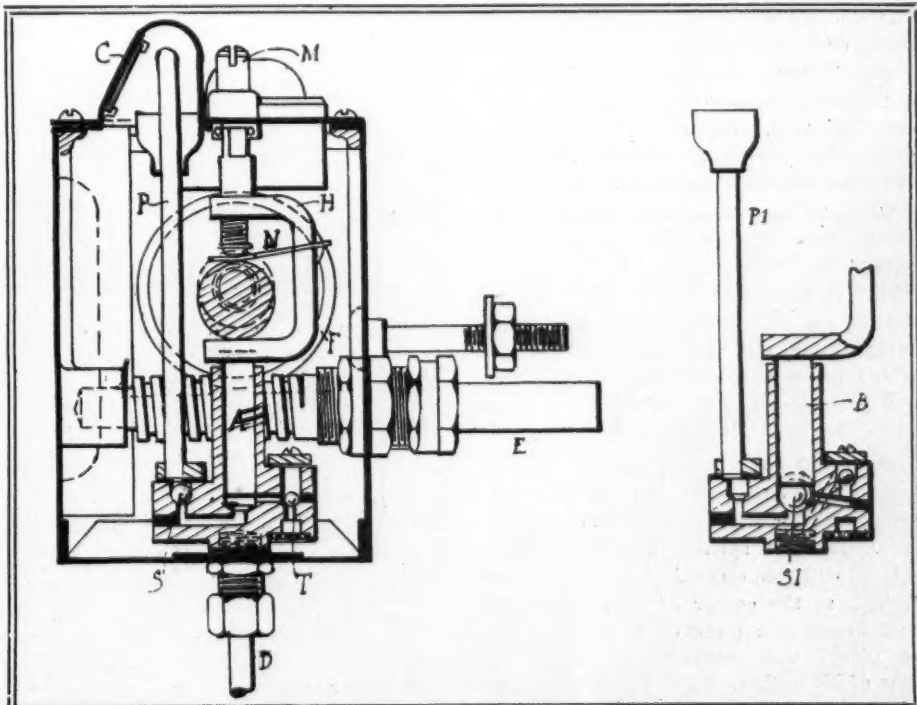


BACKE GEAR-AND-PINION TIMER

makes of motor cars in the hands of different operators the company is particularly careful to get the proper density for the work required.

INVENTS GLASS CLEANER

Prince Henry of Prussia, brother of the German Emperor, has invented a patent for an appliance for cleaning the front sides of glass wind shields during wet or wintry weather. In inclement weather, rain or snow quickly accumulates on the glass so that the driver cannot distinguish objects in front of him, and the Prince's invention is a device whereby, in pressing a spring, a roller passes over the glass, removing the dirt, water or snow. The device has been tried and found satisfactory.



McCord Class R 1909 LUBRICATOR



Brief Business Announcements



Harrisburg, Pa.—D. C. Long, who has been connected with several local garages, has gone into business on his own account, and has opened a repair shop.

Los Angeles, Cal.—Thomas Higgins is to erect a two-story garage, 120 by 168 feet, on Olive street. It is to be similar in design to the White garage in Chicago.

Madison, Wis.—The Hokanson Automobile Co., agents for the Buick, White steamer and other leading cars, is building a \$12,000 garage on East Doty street. It will be ready for occupancy December 1.

Boston, Mass.—R. W. Daniels, manager of the Studebaker branch in Boston, will have the eastern Massachusetts agency for the E-F-M car. The details were perfected a few days ago and he will have some of the cars shortly.

Grand Rapids, Mich.—It is being seriously considered in Hurontown, Mich., that a motor car route between Houghton, Hurontown and South Range would be a paying proposition. It is probable a line will be in operation in a short time.

Delta, O.—The Helveita Co. has installed a big motor truck for the purpose of carrying milk among its patrons in the vicinity of Denison, Oak Shade and Lyons. The new Helveita truck is capable of carrying eighty cans of 8 gallons each. It was driven through from Springfield, O., a distance of 150 miles, on 10 gallons of gasoline, it is stated.

Eau Claire, Wis.—The first car to be manufactured by the new Burdick Motor Car Co. for the general market will be ready on September 20. It is an 85-horsepower Burdick Greyhound and preliminary tests prove it to be an unusually powerful machine. Mr. Burdick has secured good backing and is extending the manufacturing business each day.

Wauseon, O.—Thomas Fashbaugh and David Morningstar will open a new garage at Wauseon, O., in the near future. A new building is being erected for the use of the garage and repair shop. Morningstar will have supervision of the motor car department, and George Imes will have charge of the paint room. A full line of supplies will also be carried.

Toledo, O.—Operations on the construction of the new motor car garage of the Gamble Motor Car Co. at Toledo have been suspended until spring. The new building which will be erected by Aaron Cheshbrough at the corner of Madison avenue and Fourteenth street was to have been completed and possession given by the first of November. B. O. Gamble, the head of the new concern, has decided that this would be a poor time of year to launch

the business, as it would give him the worst 4 months of the year with which to start. The property will be turned over on April 1 under the new management.

Battle Creek, Mich.—Constantine, Mich., will soon have another manufacturing plant. The stock of the Crescent Motor Car Co., of Detroit, has been secured and will be moved to Constantine soon.

Milwaukee, Wis.—Eugene Wuesthoff is erecting a \$7,000 garage on Thirteenth street, between Grand avenue and Wells street, adding another to the already large number of garages in that vicinity.

Harrisburg, Pa.—The Motor Vehicle Co., of Mulberry and Crescent streets, is installing a repair shop in the rear of its garage, the new department to be under the exclusive management of H. G. Zimmerman.

Beloit, Wis.—Joseph Saris will erect a three-story building for garage purposes. The building will cost \$10,000 and will occupy the site of the Saris garage. The two upper floors will be fitted up for offices and living rooms.

Wilmington, Del.—The Wilmington Auto Co., Franklin agent at Wilmington, Del., has under construction a large building for sales, show rooms, garage and repair work. This building is next to the new Avenue theater at Delaware avenue and Tatnall street and will be completed within 2 weeks. The building has a frontage of 83 feet on Delaware avenue and a depth of 114 feet. The show room, office and stock room are located on Delaware avenue. The greater part of the first floor will be used for storage purposes, which part will also have an entrance on Hamilton street. The second floor is reached by a substantial elevator and a



Chicago—Four Drive Auto Co.; capital stock, \$250,000; to manufacture and deal in motor cars.

New York—Buckeye Auto Sales and Renting Co.; capital stock, \$10,000; to engage in the manufacture of motor cars and locomobiles.

Boston, Mass.—Boston Automobile Garage Co., capital stock \$3,000, to deal in motor cars.

Boston, Mass.—MacGregor Garage, Inc., capital stock \$5,000, to deal in motor cars.

Louisville, Ky.—Miles Auto Co., capital stock \$5,000. Leon L. Miles, president and general manager; W. H. Curtis, vice-president, and Ada B. Harris, secretary and treasurer.

New York—Walter Christie Automobile Co. of New York city, capital stock of \$400,000, to manufacture motors, engines, cars, motor cars, trucks, etc.

Brooklyn—A. W. Blanchard, Inc., capital stock \$25,000, to manufacture motor cars, wagons, boats, etc.

large section of that story is also used for garage purposes, while a large machine and repair shop has been established taking nearly all the front on Hamilton street.

Appleton, Wis.—The Stanton garage has been opened on Johnson street. Manager Stanton was formerly a machinery salesman. He will install a vulcanizing and general repair department.

Milwaukee, Wis.—Emil Estberg, Milwaukee agent for the Pope-Hartford and Woods electric, has moved into his new quarters in the \$50,000 garage of Dr. Lewis Sherman, at 450-460 Jackson street.

Baltimore, Md.—Thomas C. Goodwin, formerly with the Baltimore branch of the Winton, is now connected with the Shaffer Mfg. Co., which has the agency for the Pullman motor cars in Baltimore.

Bus Line Established—A motor bus line was opened this week to run between Lima and Ada, O., a distance of 16 miles. Big passenger cars are now running three each way every day of the week. The line will supply a much-felt want.

New London, Wis.—The New London Auto Co., of New London, has filed articles of incorporation at Madison. The capital stock is \$5,000 and the following appear as incorporators: A. Falkenheimer, W. J. Sader and H. R. Furst.

Baltimore, Md.—Headquarters have been opened at 1010 Morton street, Baltimore, by the Zell Motor Car Co., which has the local agency for the Chalmers-Detroit. This company was recently organized with E. Stanley Zell president. Mr. Zell previously was secretary of the Motor Car Co.

New York—W. H. Byrne has been appointed receiver of the partnership property of the West Side Auto and Transportation Co., of 2180 Broadway, in a suit brought by Michael O'Connor against his partners, Thomas Doherty, Thomas Flaherty and Charles Cantillon, for a dissolution of the partnership.

Mexico City, Mex.—Edward L. de Camp, well known in the trade in the United States, is preparing to go into the motor business in this city. It is expected that he will also establish a taxicab system similar to that in use in New York. For the present he is making his headquarters at Porter's hotel.

Philadelphia, Pa.—W. H. Keller, of the Pope Mfg. Co., of Hartford, Conn., was in Philadelphia last week looking along the row with a view to placing an agency for the Pope-Hartford there. Although Mr. Keller had quite a number of interviews with prominent dealers before his departure, no announcement was made as to which concern had secured the agency for the Pope-Hartford.